VOLUME LI
NUMBER ONE

THE NATIONAL GEOGRAPHIC MAGAZINE

JANUARY, 1927

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ARTICLES and photographs are desired. For material which the Magazine can use, generous remuneration is made. Contributions should be accompanied by an addressed return envelope and postage.

IMMEDIATELY after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resulting given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

AT an expense of over $50,000 The Society sent a notable series of expeditions into Peru to investigate the traces of the Inca race. Their discoveries form a large share of our knowledge of a civilization waning when Pizarro first set foot in Peru.

THE Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole.

NOT long ago The Society granted $25,000, and in addition $75,000 was given by individual members to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people.

THE Society is conducting extensive explorations and excavations in northwestern New Mexico, which was one of the most densely populated areas in North America before Columbus came, a region where prehistoric peoples lived in vast communal dwellings and whose customs, ceremonies, and name have been engulfed in an oblivion.

TO further the important study of solar radiation in relation to long-range weather forecasting, The Society has appropriated $60,000 to enable Dr. Charles G. Abbot, of the Smithsonian Institution, to establish a station for four years on Mt. Brukkaros, in Southwest Africa.

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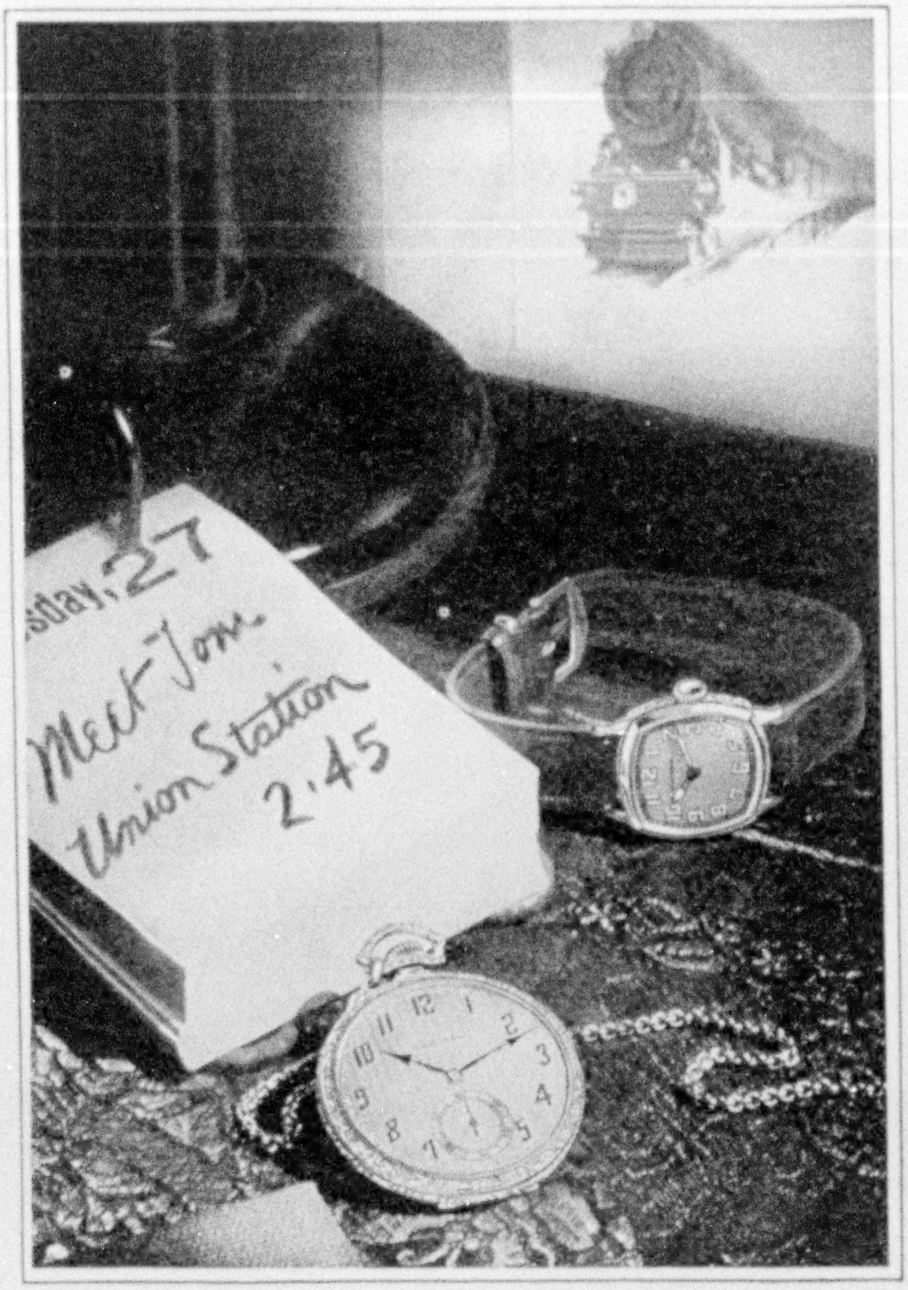

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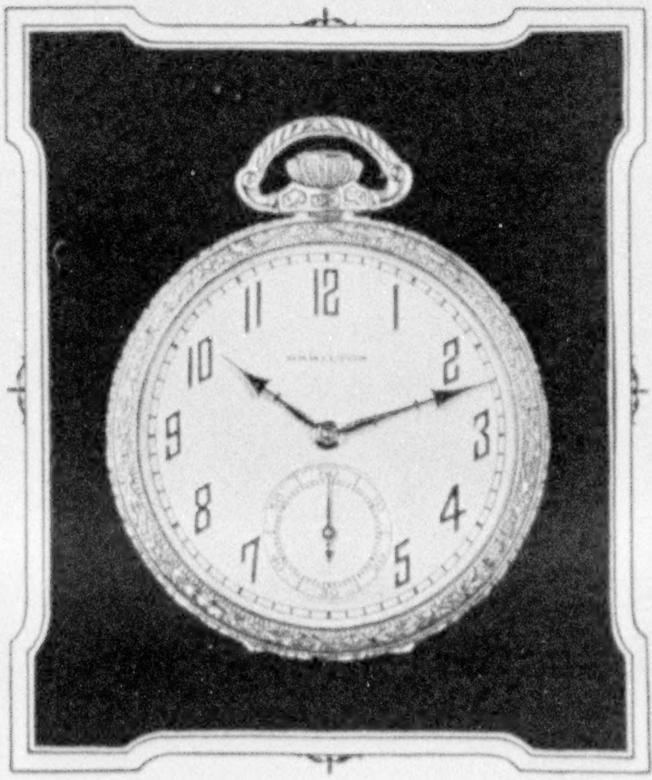

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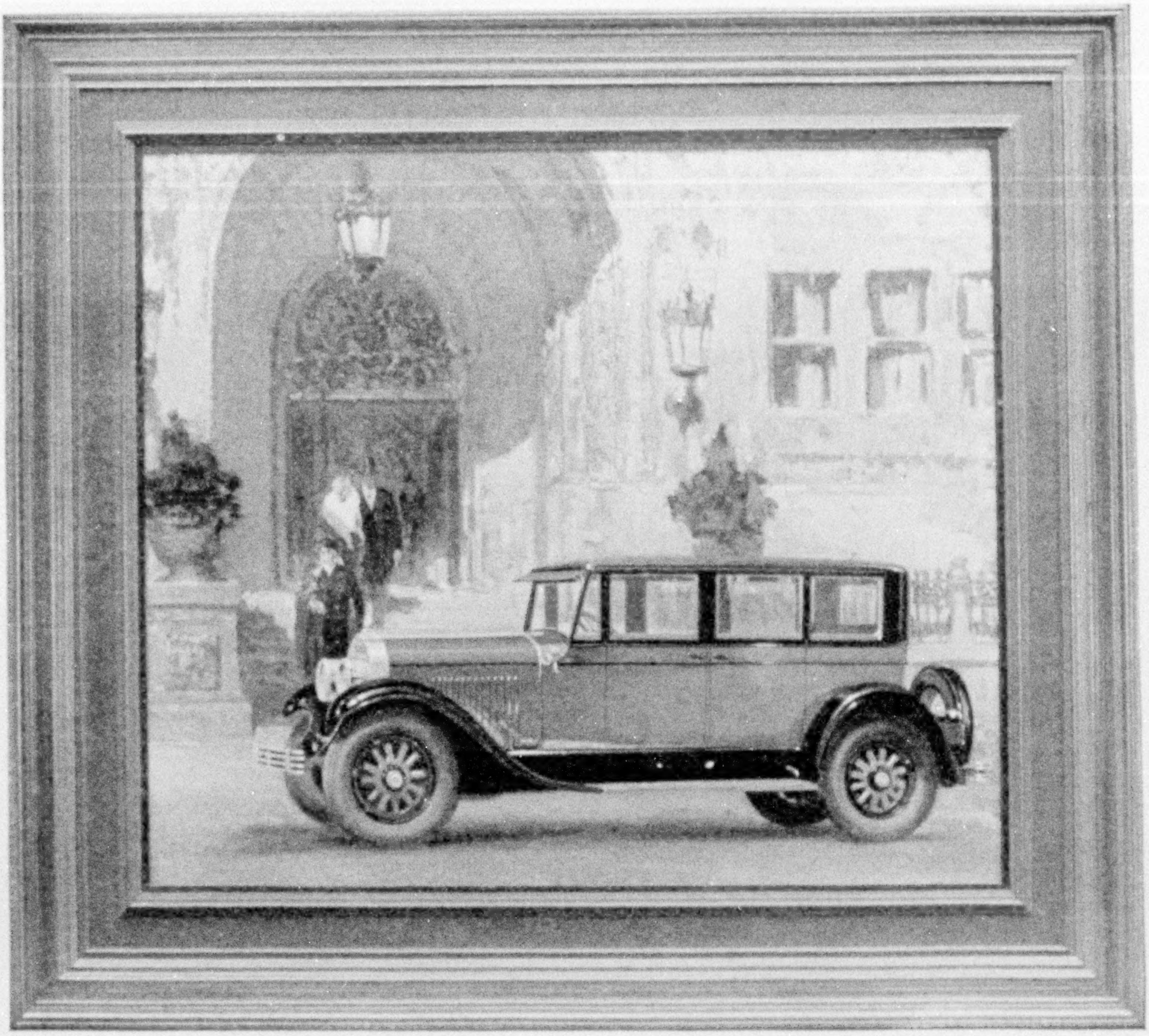

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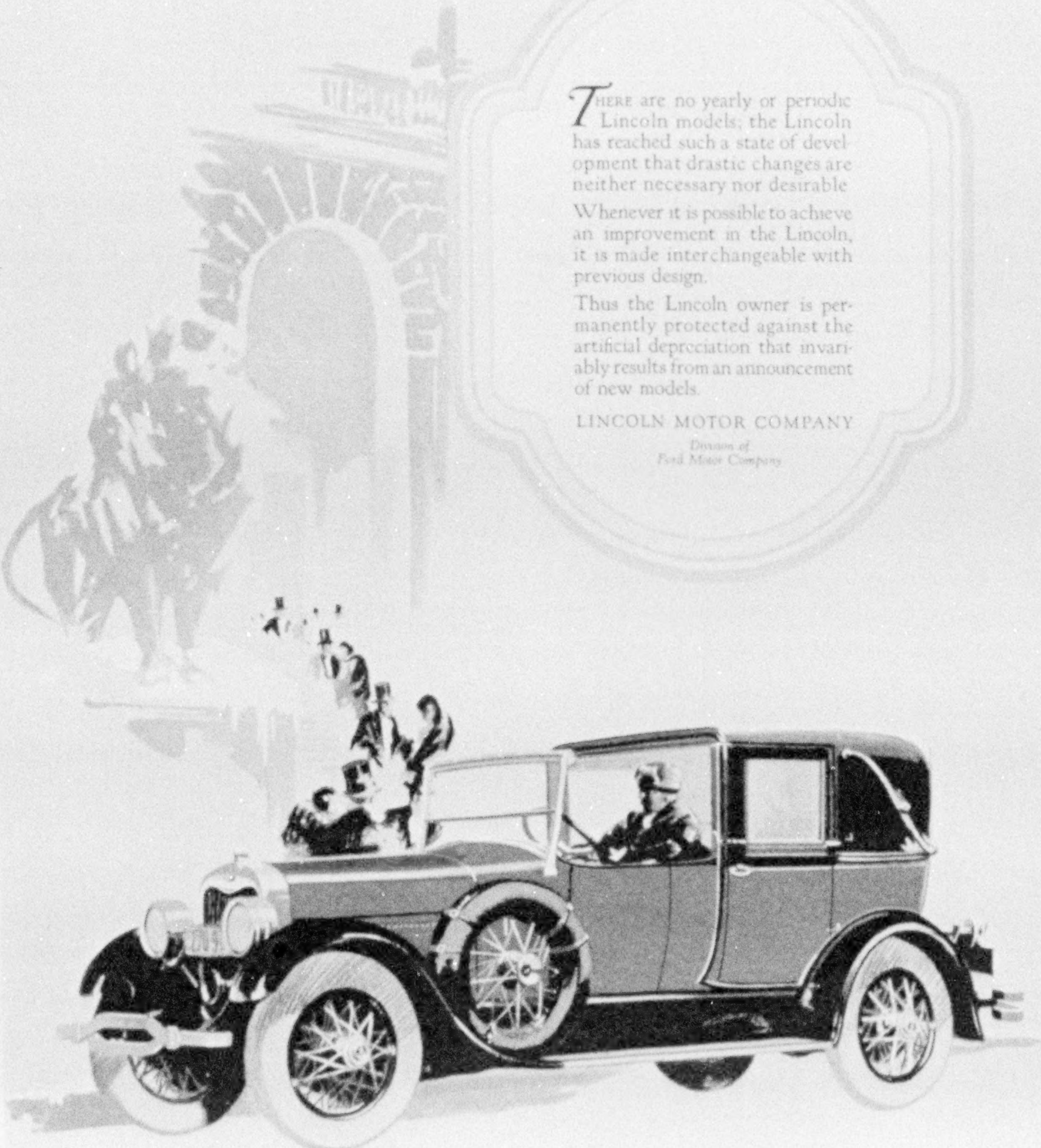

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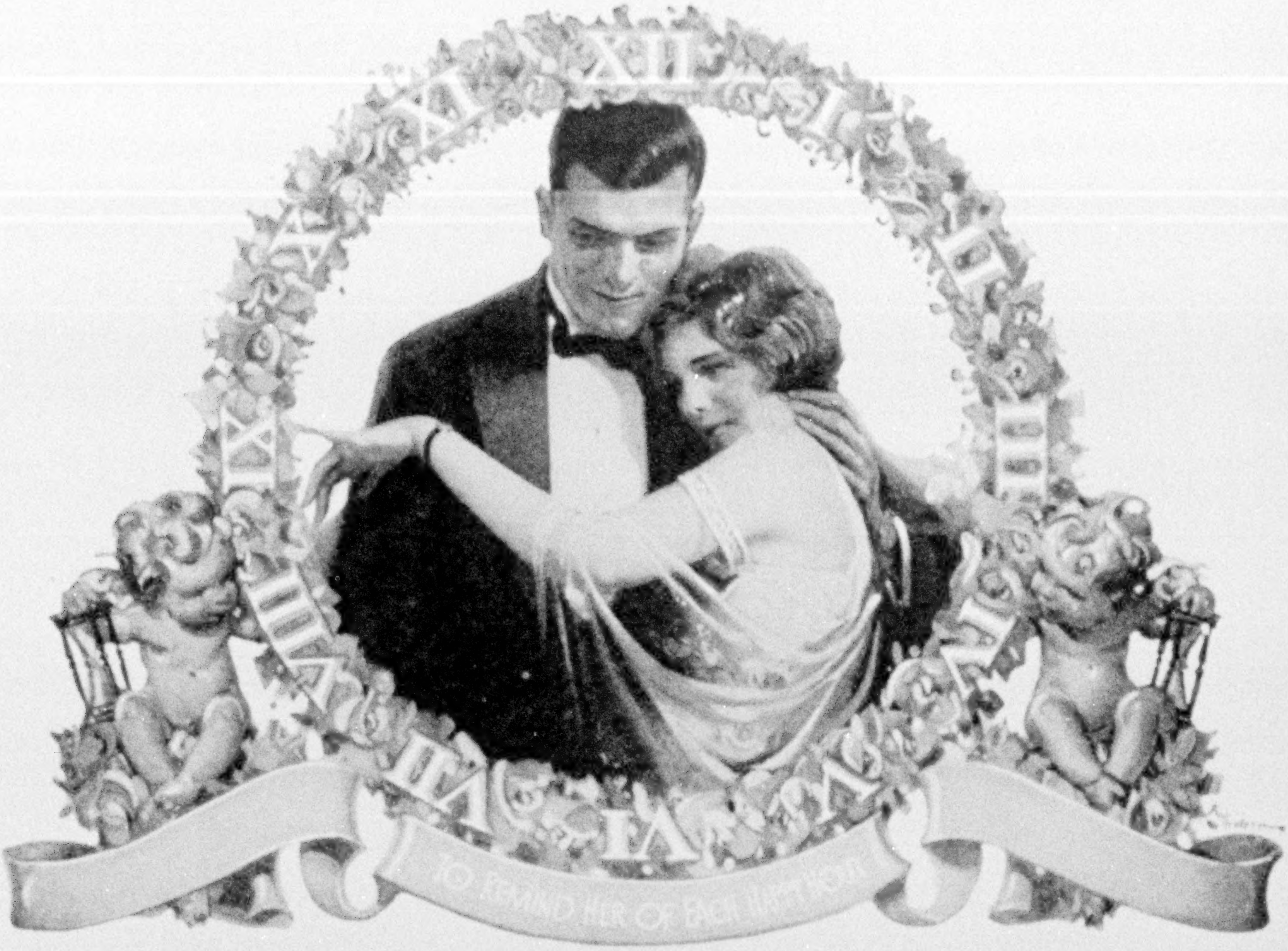
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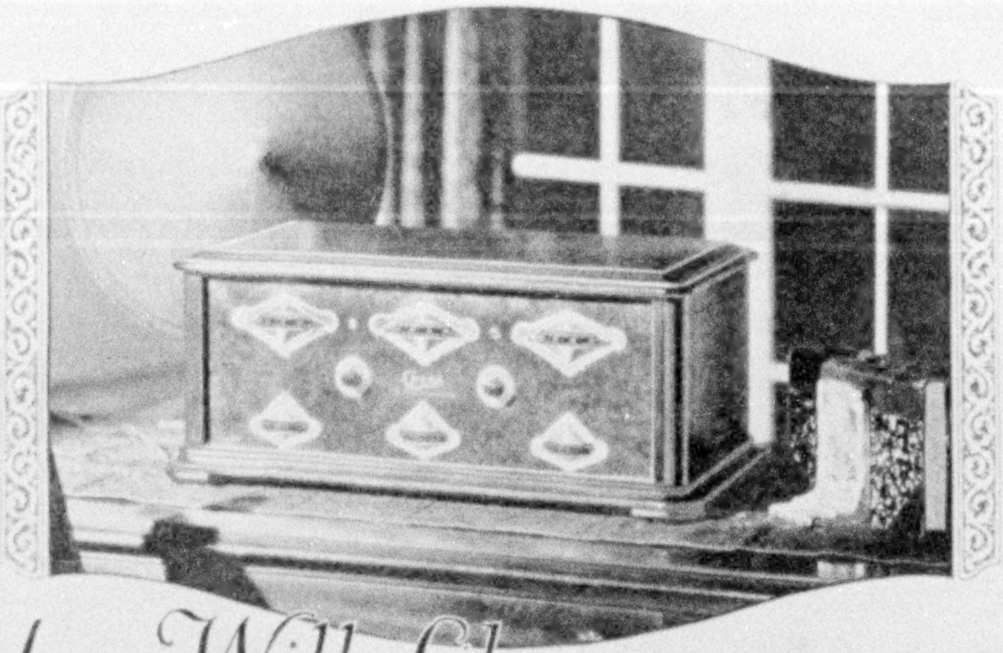

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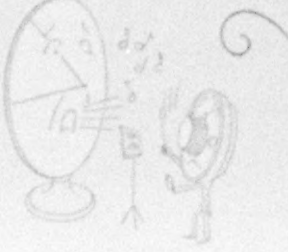

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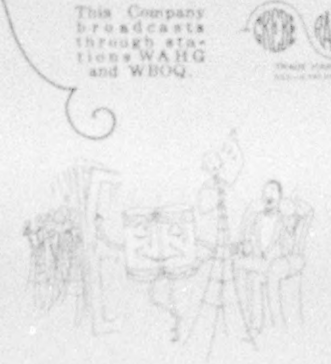

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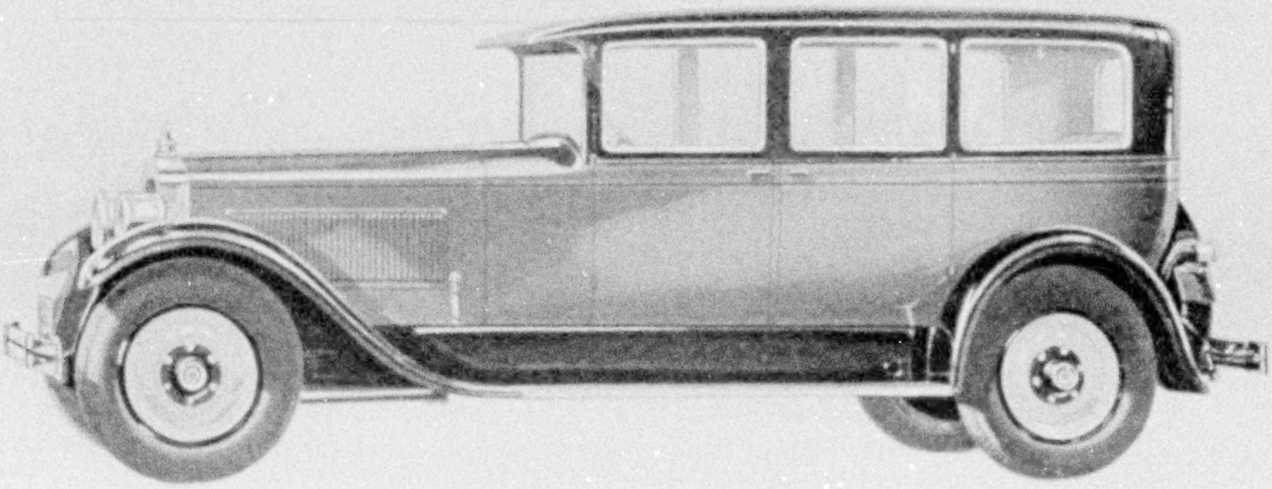

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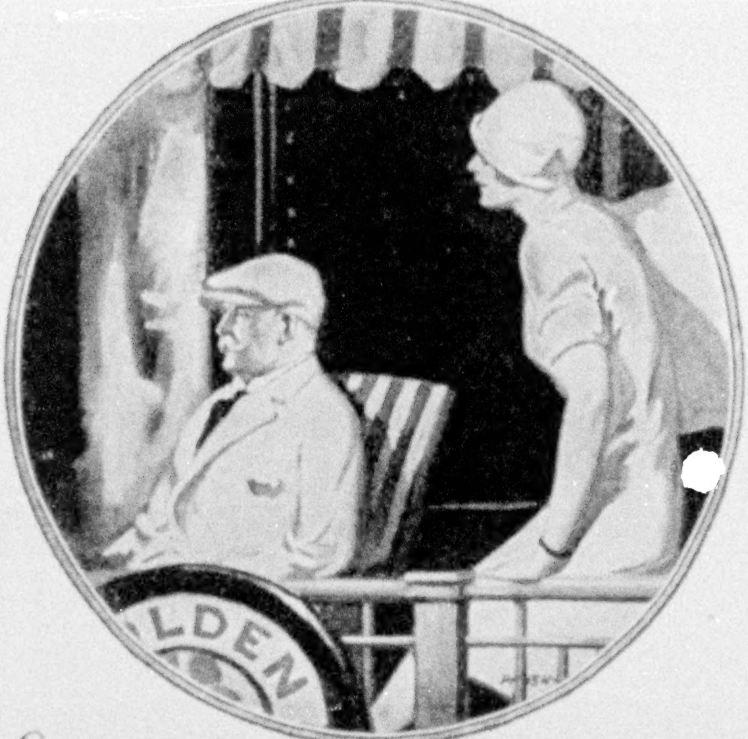

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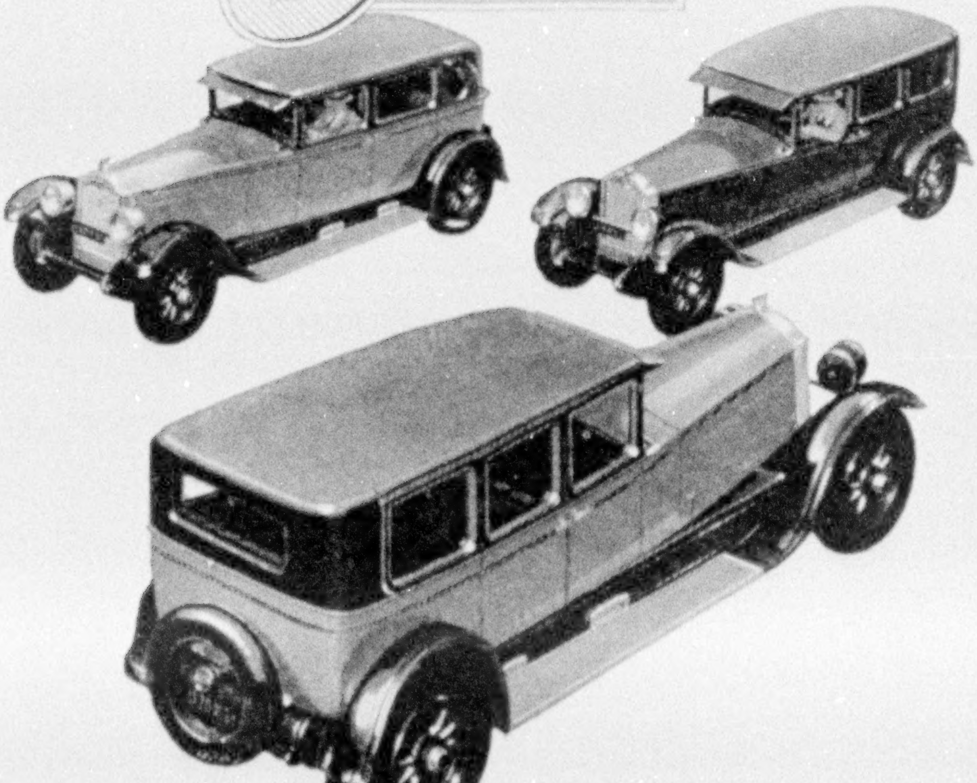

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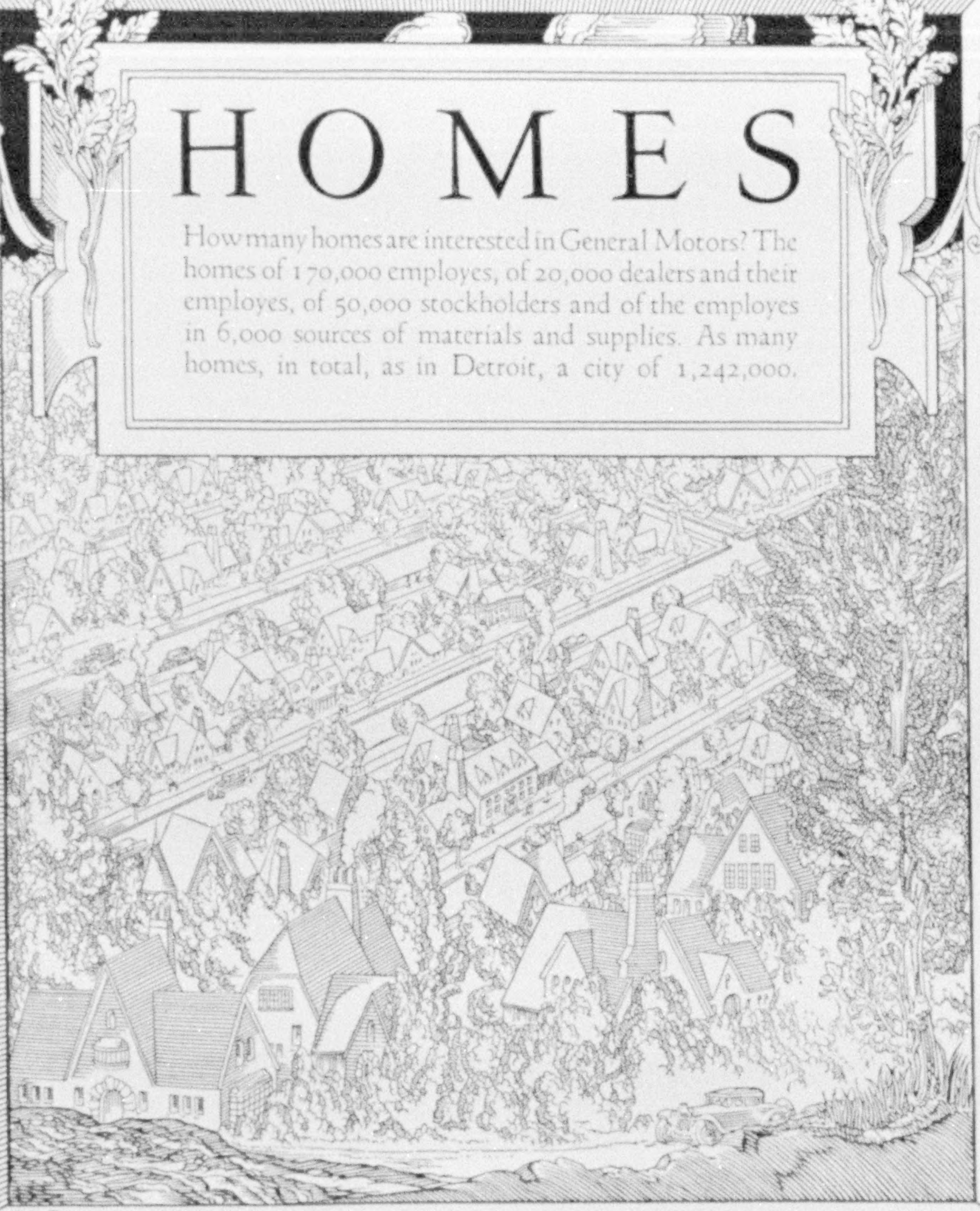

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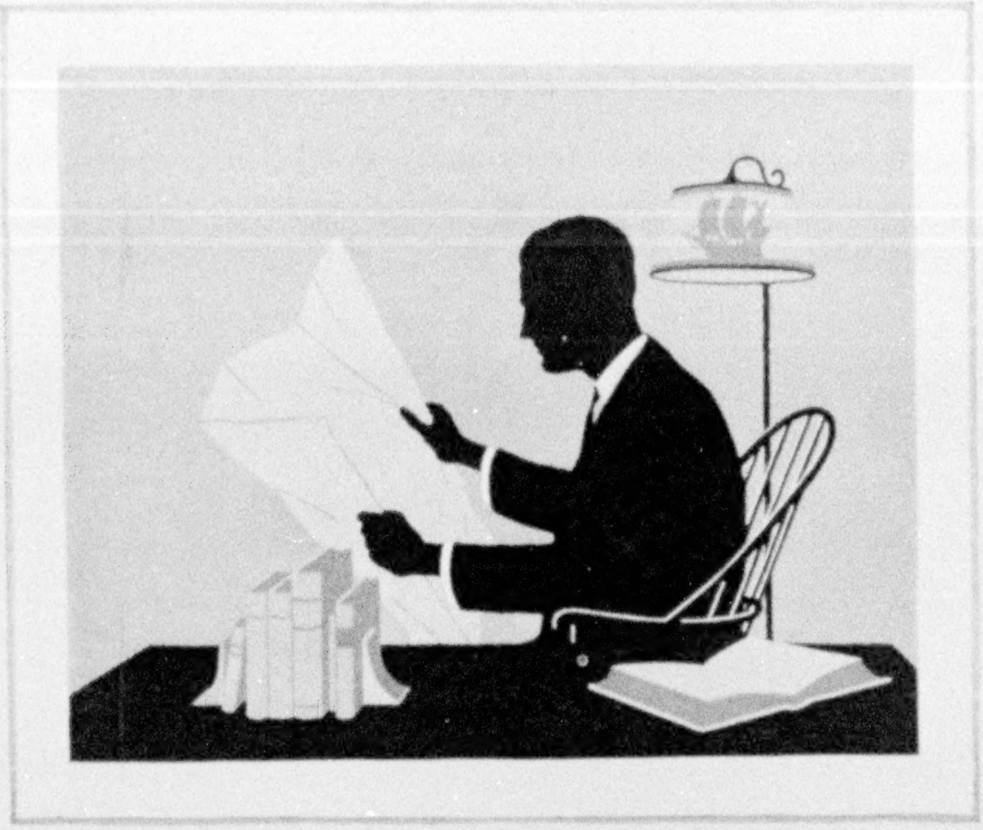

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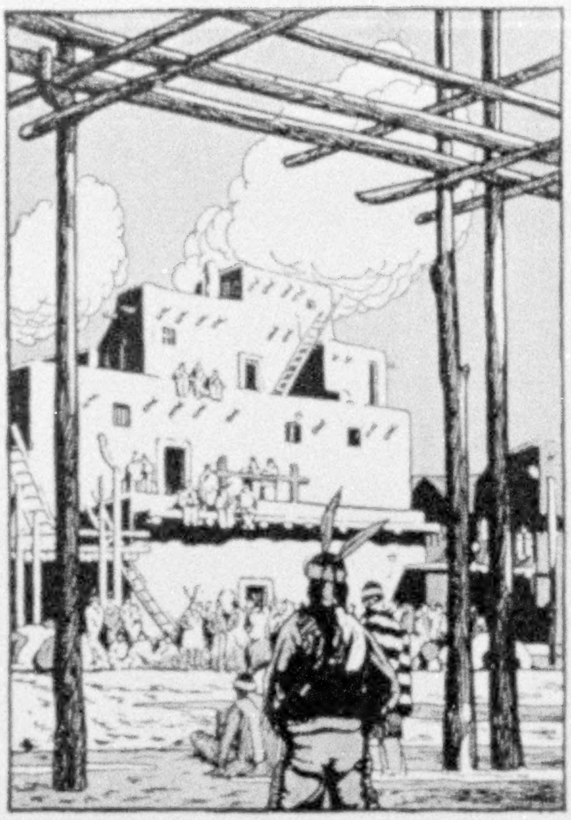

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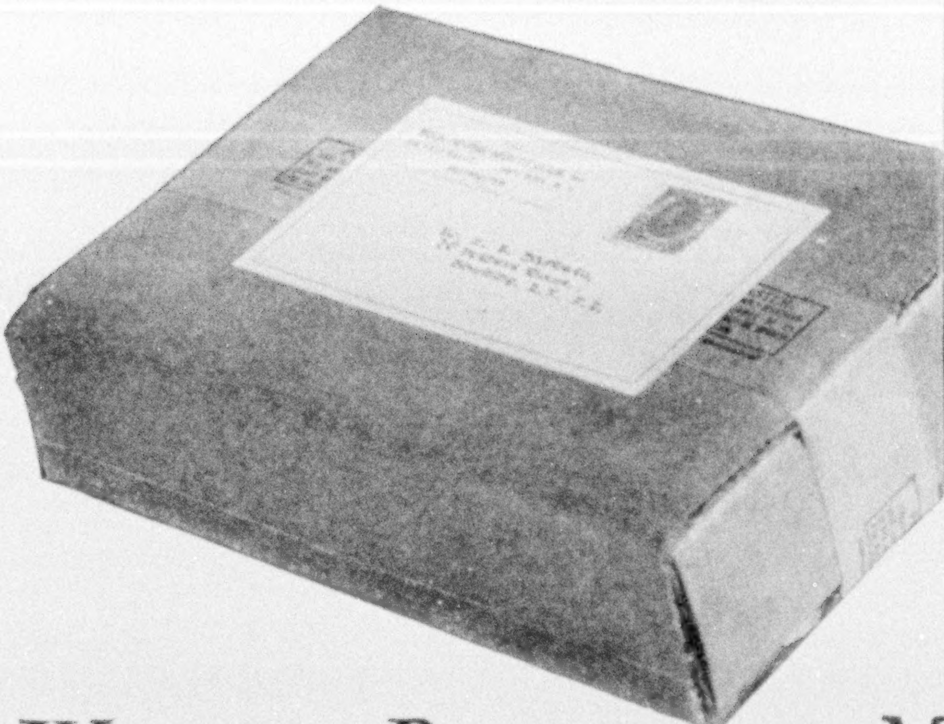

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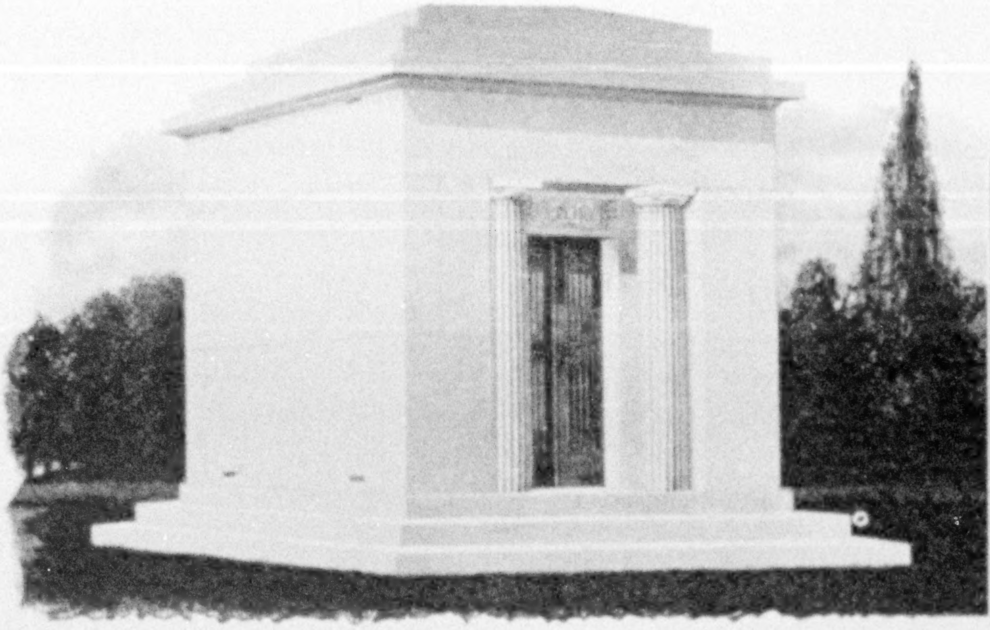

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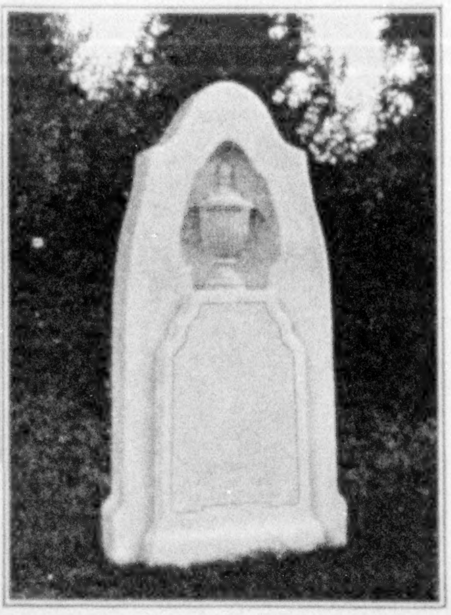

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EXCLUSIVE PRODUCERS: *Milford Pink Granite* • *Victoria White Granite* • *Stony Creek Granite*
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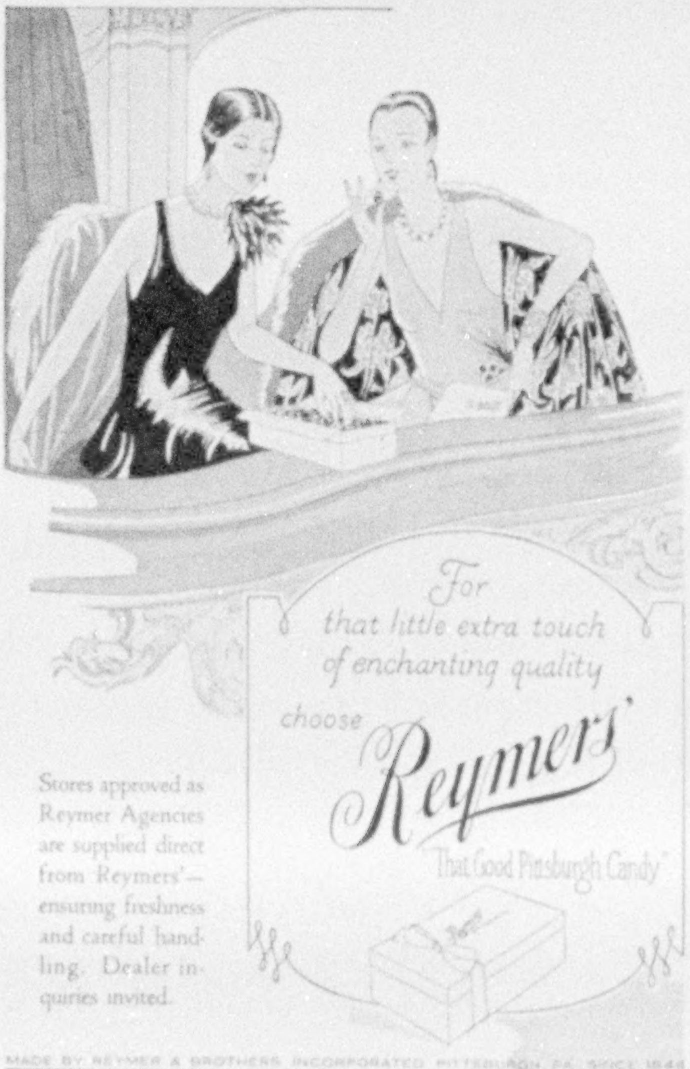


Stores approved as Reymer Agencies are supplied direct from Reymers'—ensuring freshness and careful handling. Dealer inquiries invited.

MADE BY REYMER & BROTHERS INCORPORATED PITTSBURGH, PA. SINCE 1848

Look Inside the Piano for this Trade-Mark

WESSELL, NICKEL & GROSS
NEW YORK
TRADE MARK

The Sign of the World's Standard Piano Action

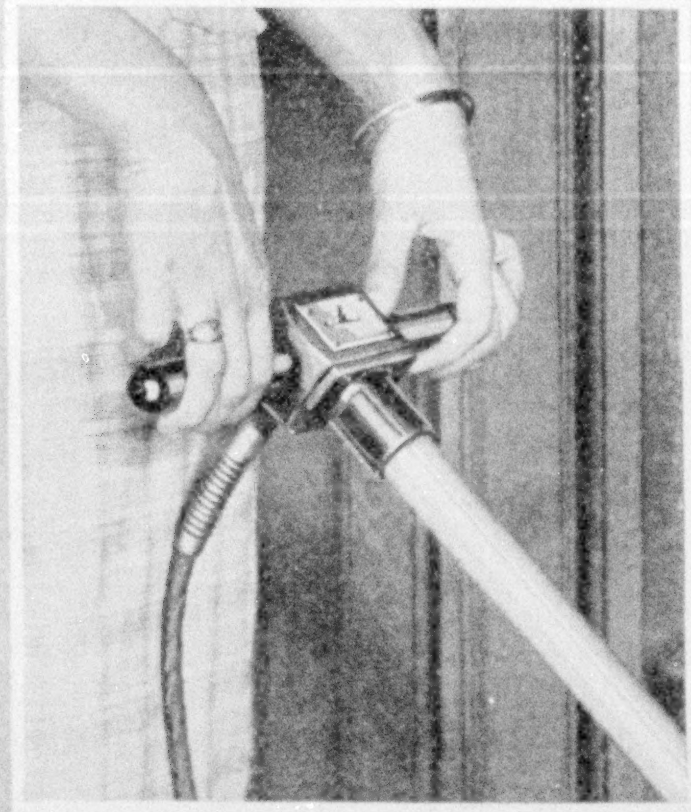
For Long Years
of Piano Satisfaction!

ARE the qualities you admire in a certain piano *permanent?* Or will that beauty of tone and that crispness of touch fade in a few short years? There is one way to make certain! Ask your dealer if the instrument is equipped with the Wessell, Nickel & Gross piano action. If so, you are assured of obtaining a quality-built piano, for this action is found only in instruments of established excellence. And remember, the piano action is the mechanism that largely controls both *tone* and *touch.*

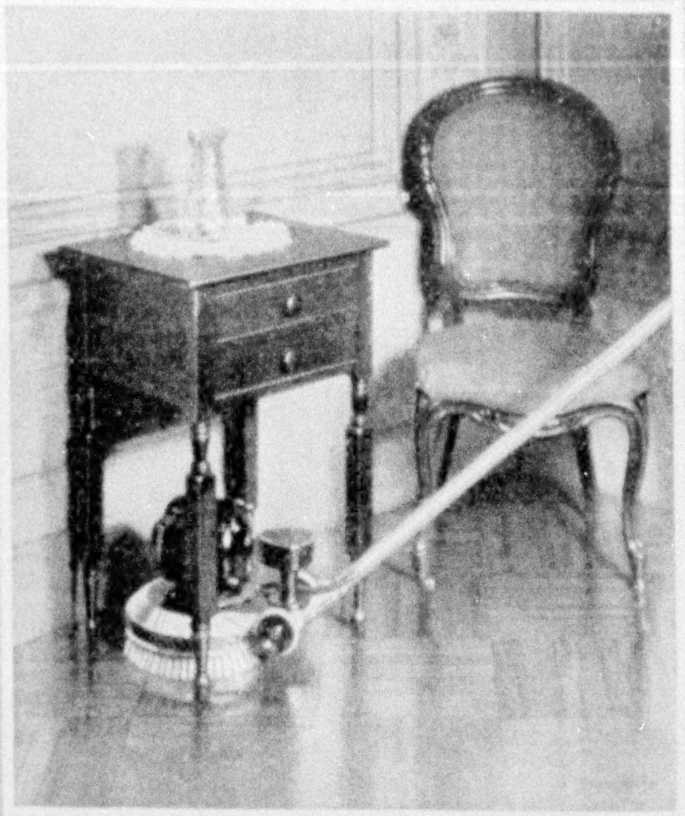
When you insist on the Wessell, Nickel & Gross action you obtain the *world's highest-priced piano action* and all that this implies. Leading American makers have used this famous action for over half a century.

WESSELL, NICKEL & GROSS
Established 1874 New York City

When you Buy an Upright, Grand, Player or Reproducing Piano—Insist on the Wessell, Nickel & Gross Piano Action.



No strength is needed to operate the machine. You guide it by raising or lowering the handle



Once your floors are refinished, the Ponsell keeps them in perfect condition

SCRAPE and REFINISH YOUR FLOORS *yourself*

This amazing little machine does all the heavy work—scrapes, sandpapers, refinishes—then keeps your floors in perfect condition forever after—costs but a fraction of one refinishing job.

NOT a mere shining up of the old homely surface, but an entirely new surface... applied after scraping off the old one.

The cost is but a fraction of ordinary methods . . . much less than a floor contractor's charge.

An amazing new machine which plugs into an electric light socket like a vacuum cleaner, and requires no more skill to operate, enables you to do the job yourself. It takes off completely the old varnish or shellac... sandpapers the floor to velvet smoothness... vigorously rubs in coats of wax... then polishes the wax to a lovely luster.

The change in your floors astonishes you. *They look like new.* Not only that—but they stay that way, for the machine takes care of them forever after. A few minutes occasional polishing, an annual or semi-annual rewaxing (operations absurdly easy), and your floors become the constant envy and admiration of your friends.

In addition, the Ponsell Floor Machine takes care of your other floors. It gives linoleum a luster surpassing anything you have ever known . . . a surface so immaculately smooth that dust and dirt have a hard time sticking to it. The machine scrubs tile, cement, or any other kind of floors as they never could be scrubbed by hand, and without the least splashing.

We have branch offices in 24 cities ready to serve you. Upon request, we offer a FREE demonstration in your own home. Or if you are too far from our nearest branch, a 10-day FREE trial. But first write for a complete description of this marvelous little machine, and what it does. Tear off the coupon now as a reminder, and then mail to us. We promise you an answer promptly.

Ponsell Floor Machine Co.
220-230 West 19th St., Dept 121, New York City

Please mail me complete information and prices regarding your Electric Floor Machine. This does not obligate me in any way whatever.

Name..

Address...

City.. State..............................

N.G.-1

Do You Make these Mistakes in ENGLISH?

Sherwin Cody

Many persons say "Did you hear from him today?" They should say, "Have you heard from him today?" Some spell calendar "calender" or "calander." Still others say "between you and I" instead of "between you and me." It is astonishing how many persons use "who" for "whom," and mispronounce the simplest words. Few know whether to spell certain words with one or two "c's" or "m's" or "r's" or with "ie" or "ei." Most persons use only common words—colorless, flat, ordinary. Their speech and their letters are lifeless, monotonous, humdrum. Every time they talk or write they show themselves lacking in the essential points of English.

Wonderful New Invention

For many years Mr. Cody studied the problem of creating instinctive habits of using good English. After countless experiments he finally invented a simple method by which you can acquire a better command of the English language in only 15 minutes a day. Now you can stop making the mistakes which have been hurting you. Mr. Cody's students have secured more improvement in five weeks than had previously been obtained by other pupils in two years!

Learn By Habit—Not by Rules

Under old methods rules are memorized, but correct habits are not formed. Finally the rules themselves are forgotten. The new Sherwin Cody method provides for the formation of correct habits by constantly calling attention only to the **mistakes you yourself make** and then showing you the right way, without asking you to memorize any rules.

One of the wonderful things about Mr. Cody's course is the speed with which these habit-forming practice drills can be carried out. You can write the answers to fifty questions in 15 minutes and correct your work in 5 minutes more. The drudgery and work of copying have been ended by Mr. Cody! You concentrate always on your own mistakes until it becomes "second nature" to speak and write correctly.

FREE Book on English

A command of polished and effective English denotes education and culture. It wins friends and favorably impresses those with whom you come in contact. In business and in social life correct English gives you added advantages and better opportunities, while poor English handicaps you more than you now realize. And now, in only 15 minutes a day—in your own home—you can actually see yourself improve by using the 100% self-correcting method.

A new book explaining Mr. Cody's remarkable method is ready. If you are ever embarrassed by mistakes in grammar, spelling, punctuation, pronunciation, or if you can not instantly command the exact words with which to express your ideas, this new free book, "How to Speak and Write Masterly English," will prove a revelation to you. Send the coupon or a letter or postal card for it now.

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Please send me your free book, "How to Speak and Write Masterly English."

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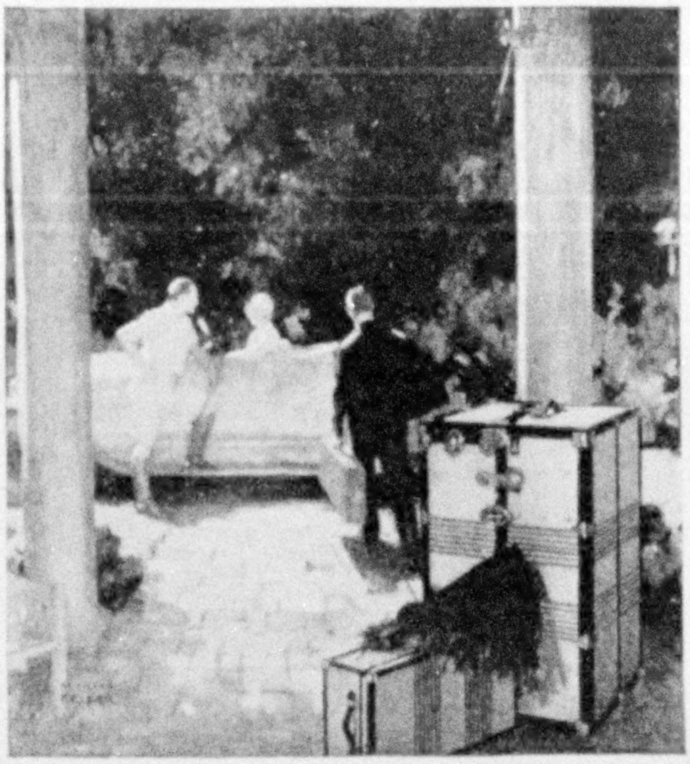
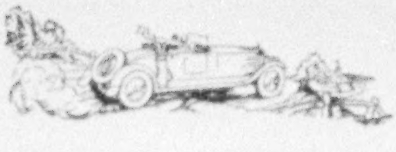


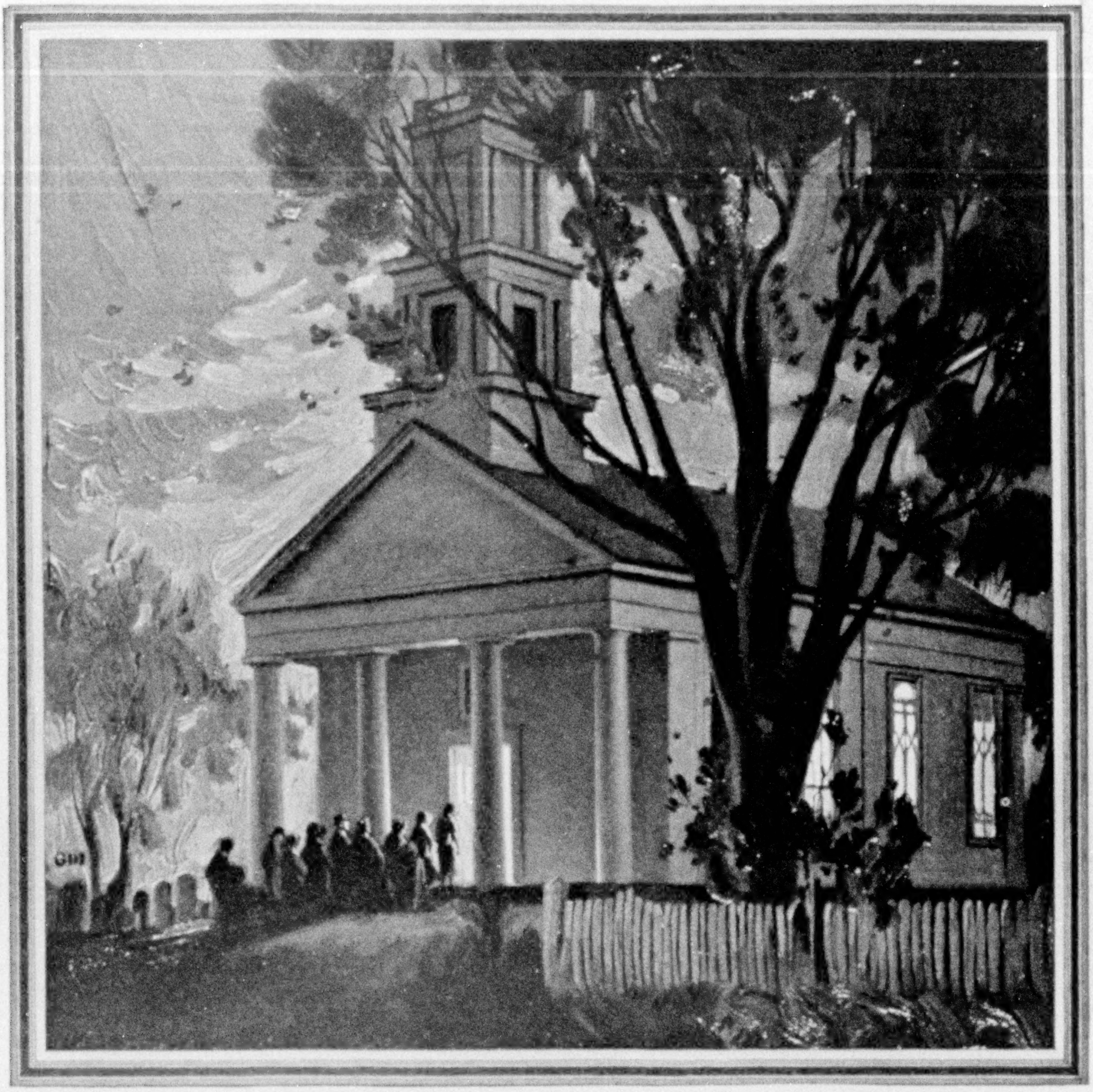
When a man has sailed the seven seas, he is quite ready to sit on the doorstep and talk about it. When an Oshkosh trunk has sailed the seven seas, it is quite ready to go sailing again—and again, and again!

We have just published an attractive and useful booklet, "Your Home Away From Home." We would be glad to send you a copy; simply address 443 High Street, Oshkosh, Wisconsin.

OSHKOSH
TRUNKS

THE OSHKOSH TRUNK COMPANY
Oshkosh, Wisconsin, and New York City





First Congregational Church of South Windsor, Conn.

The original organization of this church dates back to 1690.

This is the tenth of a series of historic New England churches painted by Glen Mitchell.

In unchanging beauty your memorial stands sentinel through the ages. Silent yet speaking with a voice that reaches beyond the grave.

Our Certificate of Perfection, when requested from any memorial dealer, assures you of our personal inspection through the various stages of completion and is your perpetual guarantee against defective workmanship and material. Write for Booklet "G"

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Rock of Ages

"The Flawless Barre Granite"

ROCK OF AGES CORPORATION

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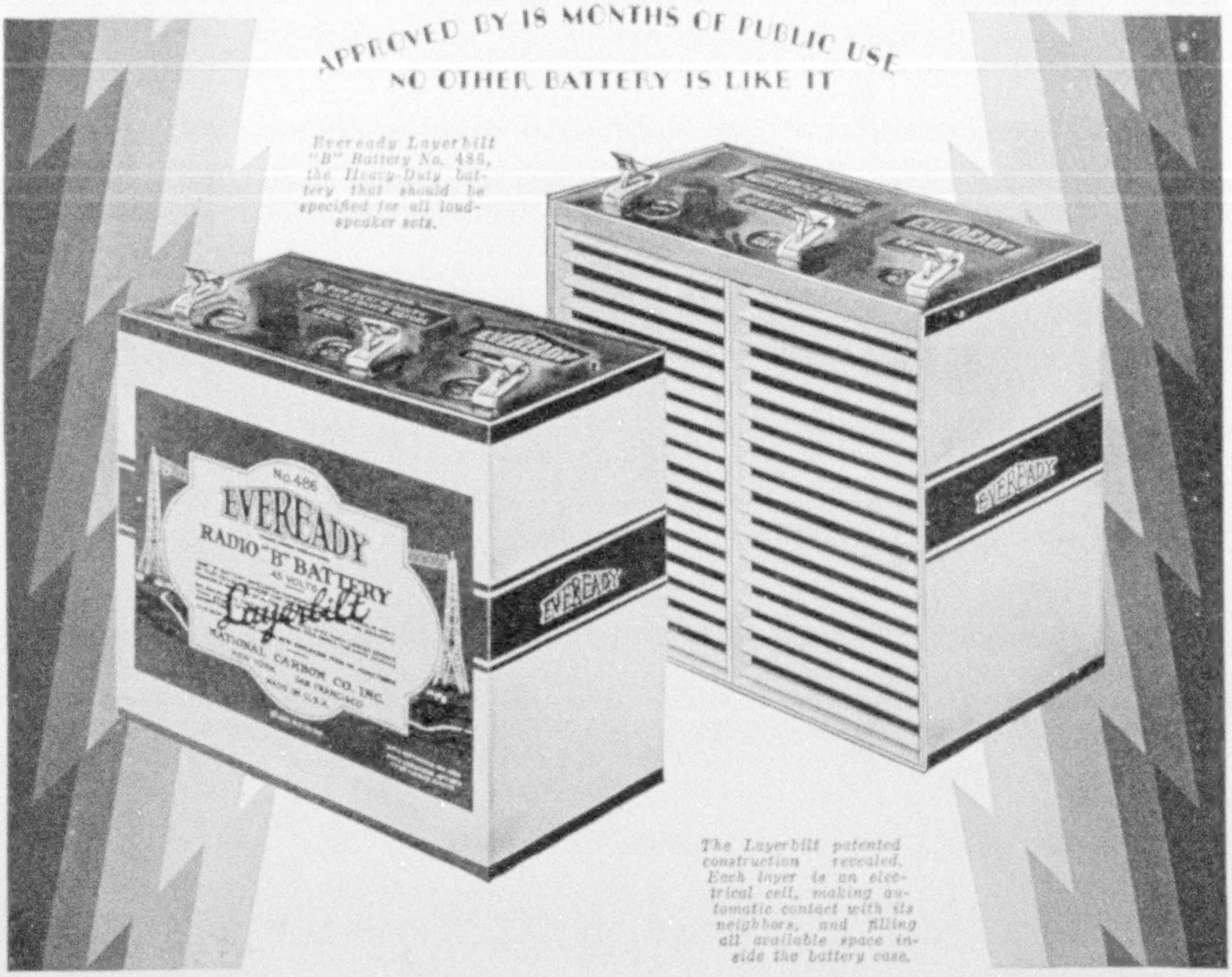

Eveready Layerbilt "B" Battery No. 486, the Heavy-Duty battery that should be specified for all loud-speaker sets.

The Layerbilt patented construction revealed. Each layer is an electrical cell, making automatic contact with its neighbors, and filling all available space inside the battery case.

Practical tests prove this new product to be the most economical of "B" batteries

In daily use in the home, Eveready Layerbilt "B" Battery No. 486 has fulfilled the promises made for it in laboratory tests. More than a year's study of the performance of this battery in the hands of the public, has shown that it is the most satisfactory and most economical "B" battery ever developed. All loud-speaker sets require Heavy-Duty batteries—and the Layerbilt has proved itself absolutely the best of them all.

Eveready Layerbilt's unequaled service is due to its unique construction. All other dry cell "B" batteries are made of cylindrical cells, with many soldered connections, and a great deal of space is wasted between the cells. The Layerbilt is built up of layers of *flat* current-producing elements, that make connection with each other automatically, and that fill all available space inside the battery case. It is every inch a battery. In it you get more active materials than in any other battery and the Layerbilt construction makes those materials more efficient current producers.

Just remember this about "B" batteries—Heavy-Duty batteries are more economical than the smaller Light-Duty batteries on all loud-speaker sets, and the patented exclusive Eveready Layerbilt No. 486 is the most economical of all.

Manufactured and guaranteed by
NATIONAL CARBON CO., INC.
New York San Francisco
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Toronto, Ontario

Tuesday night is Eveready Hour Night—9 P. M., Eastern Standard Time, through the following stations:

WEAF—*New York*
WJAR—*Providence*
WEEI—*Boston*
WTAG—*Worcester*
WFI—*Philadelphia*
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WSAI—*Cincinnati*
WTAM—*Cleveland*
WWJ—*Detroit*
WGN—*Chicago*
WOC—*Davenport*
WCCO *Minneapolis*
St. Paul
KSD—*St. Louis*
WRC—*Washington*

Tuck him in ~ Safe

FORTUNATE are the mothers of today. They can protect their babies from one of childhood's greatest enemies—smallpox.

Before vaccination was discovered, mothers were powerless against this terrible disease—more prevalent than measles. Among children who died, under 10 years of age, smallpox was responsible for one out of three deaths. Over and over again smallpox swept the world, leaving its thousands of dead, thousands cruelly disfigured, thousands blind and deaf.

Then came vaccination—and the number of deaths from smallpox went down and down. The end would have been reached but for the well-meaning, but misinformed persons who clamored that "vaccination is a crime"—that "sunshine and cleanliness, not vaccination, drive out smallpox".

If such reckless statements are believed and parents do not have their children vaccinated, smallpox may again attack the children as it did a little more than a century ago.

In the past, when arm to arm inoculation was common and persons were inoculated direct from smallpox patients, there were many deaths following attempts at prevention. Today, vaccination is safe. The only mishaps that can occur are due to carelessness in protecting the vaccinated area. The vaccine now used is produced under the control and supervision of the United States Government.

Smallpox comes from unsuspected sources. Because it takes 12 days to develop, it is possible for immigrants or returning travellers to bring smallpox into the country with them.

Smallpox can be stamped out only by systematic vaccination. Every child should be vaccinated before he is one year old and again during school years. Immunity wears off in time—anywhere from five to fifteen years—*and leaves one again susceptible.* Is it more than seven years since you were vaccinated?

Now—before the danger is upon you—make sure that you and yours are properly protected. Be safe.

Before the Philippine Islands were occupied by the American Army in 1898, thousands of persons died from smallpox every year. Vaccination carried on under the direction of Army officials drove smallpox down to only 273 deaths in one year.

Then came a period when vaccination of children was neglected. As a result, the worst epidemic of modern times broke out in 1918-19 with 60,855 deaths—75 per cent of which were of children under 9 years of age.

Statistics show the lowest average number of cases per 100,000 of population in the states in which vaccination is compulsory; the next highest average in the optional states and the highest in the states without vaccination laws.

The Metropolitan Life Insurance Company will gladly mail, free, booklets which give the facts—"Smallpox" and "The Story of Edward Jenner", the man who discovered vaccination. Send for them.

HALEY FISKE, *President.*

THE LIGHT THAT NEVER FAILS

Published by

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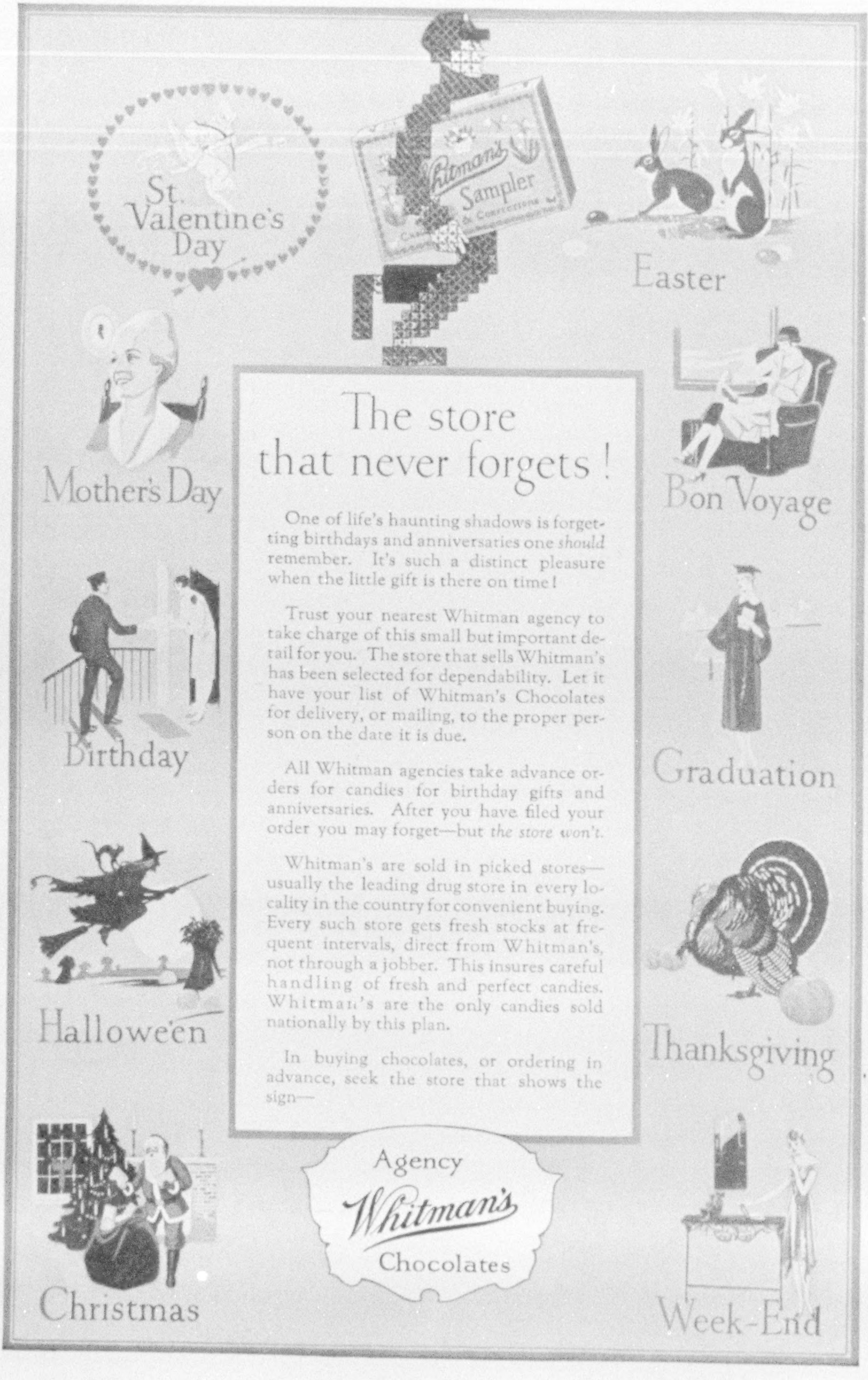
Biggest in the World, More Assets, More Policyholders, More Insurance in force, More new Insurance each year


St. Valentine's Day
Whitman's Sampler
Easter
Mother's Day
Bon Voyage
Birthday
Graduation
Halloween
Thanksgiving
Christmas
Week-End

The store that never forgets!

One of life's haunting shadows is forgetting birthdays and anniversaries one *should* remember. It's such a distinct pleasure when the little gift is there on time!

Trust your nearest Whitman agency to take charge of this small but important detail for you. The store that sells Whitman's has been selected for dependability. Let it have your list of Whitman's Chocolates for delivery, or mailing, to the proper person on the date it is due.

All Whitman agencies take advance orders for candies for birthday gifts and anniversaries. After you have filed your order you may forget—but *the store won't.*

Whitman's are sold in picked stores—usually the leading drug store in every locality in the country for convenient buying. Every such store gets fresh stocks at frequent intervals, direct from Whitman's, not through a jobber. This insures careful handling of fresh and perfect candies. Whitman's are the only candies sold nationally by this plan.

In buying chocolates, or ordering in advance, seek the store that shows the sign—

Agency
Whitman's
Chocolates

VOL. LI, No. 1 WASHINGTON JANUARY, 1927

THE NATIONAL GEOGRAPHIC MAGAZINE

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JAMAICA, THE ISLE OF MANY RIVERS

By JOHN OLIVER LA GORCE, M. A., LITT. D.

AUTHOR OF "PORTO RICO, THE GATE OF RICHES," "THE TREASURE HOUSE OF THE GULF STREAM," "PENNSYLVANIA, THE INDUSTRIAL TITAN OF AMERICA," "THE FIGHT AT THE TIMBERLINE," ETC., IN THE NATIONAL GEOGRAPHIC MAGAZINE

THE hardy Norsemen and the fur-trimmed Eskimo may freely have my equity in the icy deserts and wind-ripped regions of the Far North. At least that was my feeling when our steamship nosed out of New York Harbor, her decks and rigging covered with an inch or two of grimy ice and snow, turned south by east from Sandy Hook light to hunt for a region where the flowers were abloom and where summer indeed flourished in the lap of winter.

In less than 24 hours, as we moved rapidly along with the Jersey and Virginia capes far abeam and began to flirt with the grand old Gulf Stream, that God-given "warm river in the ocean," which was christened by Benjamin Franklin in 1770, a gradual change took place, not only in climatic conditions, but in the spirits of the ship's company. Soon the inky ice that rendered the open decks unsafe footing for the landlubber took wings, for the sun turned to its pleasant task of dissipating the enemy and the passengers actually smiled at one another.

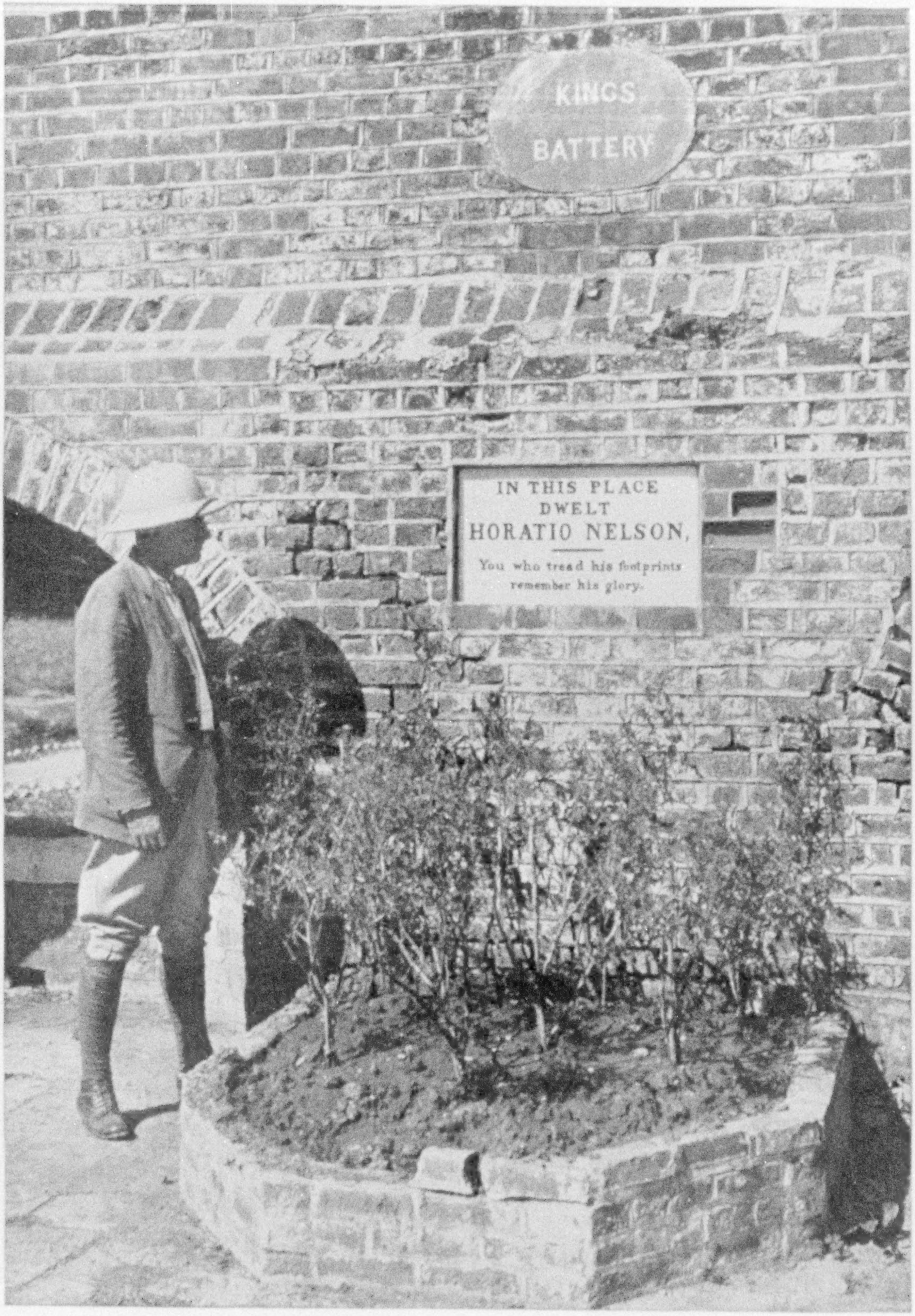
Jamaica was our destination, and geographically that Xaymaca—as the Arawak Indians seem to have called their homeland—is the key to the Caribbean, for its tide-swept strand is approximately equidistant from the Yucatan Channel, which in turn is the gateway to the Tehuantepec route; from San Juan del Norte (Greytown), the Atlantic end of any possible Nicaraguan Canal; from Colón, the north entrance to the Panama Canal; from Cartagena, which is a principal port on the northern coast of South America, and from Mona Passage, the European ship lane between Haiti and Porto Rico.

THE RENDEZVOUS OF OCEAN HIGHWAYMEN

It was this strategic situation, commanding all known ship routes that lead in and out of the Caribbean Sea, which made Jamaican waters the natural hunting ground of the buccaneers, privateers, and pirates of the days that cluster around the times of Morgan and Kidd, of l'Olonoise and Blackbeard—gallows birds all.

Jamaica has an area about equal to that of the State of Connecticut, yet nowhere can one reach a point as much as 25 miles from the seashore! There are approximately the same number of miles of motor roads as in the Nutmeg State, and if Jamaica's business men would only awaken to their opportunity and organize for 20th-century progress in the building of suitable, if small, hotels throughout the island, it would become one of the world's finest and most populous midwinter playgrounds, where the charm of the Tropics and the health-giving coolness of mountains meet and join hands in a successful effort to please.

The approach to Jamaica from the north by the usual steamship routes is enough to put any new visitor to the Antilles on tiptoe of expectancy. If the schedule is fortunate, you may pass Watling Island,


KINGS BATTERY
IN THIS PLACE DWELT HORATIO NELSON, You who tread his footprints remember his glory.

Photograph by Jacob Gayer

THE STATION OF THE HERO OF TRAFALGAR

England's hero, Lord Nelson, was for a time in command of Fort Charles, when scarcely twenty-one, and even then gave proof of naval genius (see text, page 5).

Photograph by Gilbert Grosvenor

THE SUNKEN CITY OF PORT ROYAL LIES BENEATH THE WATER IN THE FOREGROUND

You sail directly over the vanished city of "battle, murder, and sudden death," which once enjoyed the questionable distinction of being "the wickedest city of its day." It was swallowed by the sea during the tremendous earthquake of June 7, 1692 (see text below and page 5).

amid the Bahamas, generally regarded as the first land of the New World sighted by Columbus on a morning in 1492, and by the next afternoon more than likely the magnificently terraced mountains of Cape Maisi, Cuba, loom up ahead, and presently you are passing so close to the eastern extremity of Cuba that you can almost wave to the native fishermen ashore.

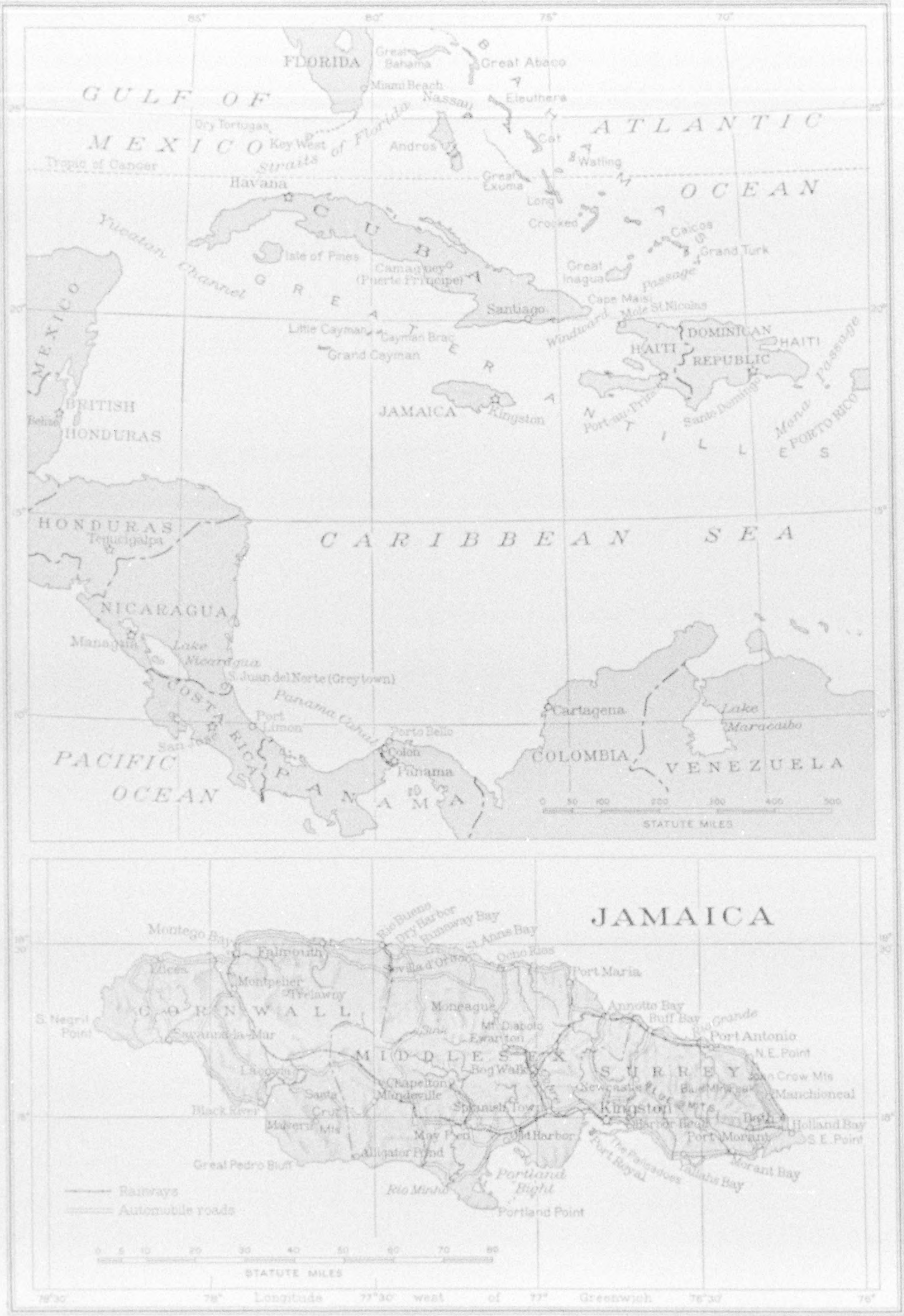
Far off to port rise the hazy crests of the mountains of Haiti, at whose base is Mole St. Nicolas, so well remembered in modern times as a date line in the Spanish-American War. For you are sailing through the Windward Passage, which figured so largely in the American naval maneuvers, through which Cervera was bottled up in Santiago Harbor. Spain never had much naval luck in these warm seas.

AN ISLE OF SURPRISES

The pleasant glimpses throughout the day's sail prepare the voyager for those of the early morrow, for the morning, and sunshine, will bring the John Crow Mountains of eastern Jamaica into view. Rounding South East Point, the extremity of the island, the sturdy steamer of the White Fleet turns its nose westward, and on past Port Morant and Yallahs Bay, with as fair a palm-studded plain off the starboard rail as you could ever wish to see, guarded in the background by the splendor of the Blue Mountains, rising to an ultimate height of nearly a mile and a half above the strand—and what a surprise to those of us who somehow carry the subconscious feeling that tropical isles are pretty flat and mostly sand at that!

Then heaves in sight the historic Palisadoes, that narrow spit which separates Kingston Harbor from the Caribbean Sea and beyond which lies the capital city of the British West Indies.

As you round the head of the Palisadoes you view what you may of Port Royal, that vanished city of "battle, murder, and sudden death"—well known to us in song and story of pieces of eight, of


GULF OF MEXICO
FLORIDA
Great Bahama
Great Abaco
Miami Beach
Nassau
Eleuthera
Dry Tortugas
Key West
Straits of Florida
Andros
Cat
Watling
ATLANTIC OCEAN
BAHAMA
Tropic of Cancer
Havana
CUBA
Great Exuma
Long
Crooked
Caicos
Grand Turk
Yucatan Channel
Isle of Pines
Camaguey (Puerto Principe)
Great Inagua
Passage
Cape Maisi
Mole St Nicolas
MEXICO
GREATER ANTILLES
Santiago
Windward
Little Cayman
Cayman Brac
Grand Cayman
HAITI
DOMINICAN REPUBLIC
HAITI
JAMAICA
Kingston
Port au Prince
Santo Domingo
Mona Passage
PORTO RICO
BRITISH HONDURAS
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HONDURAS
Tegucigalpa
CARIBBEAN SEA
NICARAGUA
Managua
Lake Nicaragua
S. Juan del Norte (Greytown)
Panama Canal
Port Limon
Porto Bello
Colon
Panama
COSTA RICA
San Jose
Cartagena
Lake Maracaibo
PACIFIC OCEAN
PANAMA
COLOMBIA
VENEZUELA
0 50 100 200 300 400 500
STATUTE MILES
85° 80° 75° 70°
25° 20° 15° 10°
JAMAICA
Montego Bay
Falmouth
Rio Bueno
Dry Harbor
Runaway Bay
St. Anns Bay
Ocho Rios
Port Maria
Lucea
Montpelier
Trelawny
Sevilla d'Oro
Moneague
S. Negril Point
CORNWALL
Savanna-la-Mar
Mt. Diablo
Ewarton
Annotto Bay
Buff Bay
Rio Grande
Port Antonio
N.E. Point
MIDDLESEX
SURREY
Bog Walk
Lacovia
Santa Cruz Mts
Chapelton
Mandeville
Newcastle
Blue Mts
John Crow Mts
Manchioneal
Black River
Spanish Town
Kingston
Bath
Holland Bay
S.E. Point
Malvern
May Pen
Old Harbor
Port Morant
Morant Bay
Alligator Pond
Port Royal
The Palisadoes
Yallahs Bay
Great Pedro Bluff
Portland Bight
Rio Minho
Portland Point
Railways
Automobile roads
0 5 10 20 30 40 50 60 70 80
STATUTE MILES
18°30' 18°
78°30' 78° Longitude 77°30' west of 77° Greenwich 76°30' 76°

Drawn by A. H. Bumstead

A SKETCH MAP OF JAMAICA, THE KEY TO THE CARIBBEAN

The island has an area about equal to the State of Connecticut, yet no point inland is more than 25 miles from the sea. Its strategic position (see upper map), commanding all trade routes in the West Indies, has given it a fascinating background of tradition and history.

golden doubloons, and pearls of price plundered from his Spanish Majesty's citizens of the New World who followed in the wake of the Great Admiral.

Port Royal is, in good truth, not much to look at to-day. Fort Charles, the coast defense of Kingston, yawns there, with its inscription that gives instant pause to visiting feet: "In this place dwelt Horatio Nelson. You who tread his footprints, remember his glory." There, also, is the paved platform over which the future Hero of Trafalgar so impatiently paced to and fro while, spyglass in hand, watching with tired young eyes for the dreaded French fleet that was expected to attack Port Royal in 1779 (see page 2).

What memories the little settlement brings back! History and legend call Port Royal the pirates' Babylon and the wickedest city of its day. Here in many a curious and seabitten craft were brought the treasures of the sea wolves of yesterday. Here swaggered the sea rovers, laden with blood-stained plunder, who harried the tropical seas with the skull to the breeze and scuttled the silver ships and richer cities of New Spain. Their name was legion!

Before 1692 it was the City of Gold. In the words of Henderson, "bearded seamen, bronzed and weather-stained, but decked with priceless jewelry and the finest silks of the Orient, swaggered along its quays and gambled with the heavy gold coins whose value no one cared to estimate. The drinking shops were filled with cups of gold and silver, embellished with flashing gems torn from half a hundred cathedrals. Each house was a treasure store. The place was a gilded hades, and mammon held sovereign sway over its people. Common seamen hung their ears with heavy gold rings studded with the costliest gems. Dagger thrusts were as common as brawls, and the body of a murdered man would remain in a dancing room until the dancing was over. Gold and precious stones were cheap, but life was cheaper. And every man in that crowd of pirates lived beneath the shadow of the gallows.

"Ships fitted out for home defense began to assume the rôle of privateers, and the step from authorized privateer to unauthorized buccaneer was so easy that when the habit of plundering got established in the blood there was no check for it."

Even the English Governor Modyford, who was subsequently deposed because he commissioned privateers that in reality were pirates, wrote home: "The Spaniards wondered much at the sickness of our people, until they knew the strength of their drinks; then they wondered more that they were not all dead." Another contemporary writer says that buccaneers were known to spend 2,000 to 3,000 pieces of eight in a single night—a sum that in the value of that day would put Broadway in the shade.

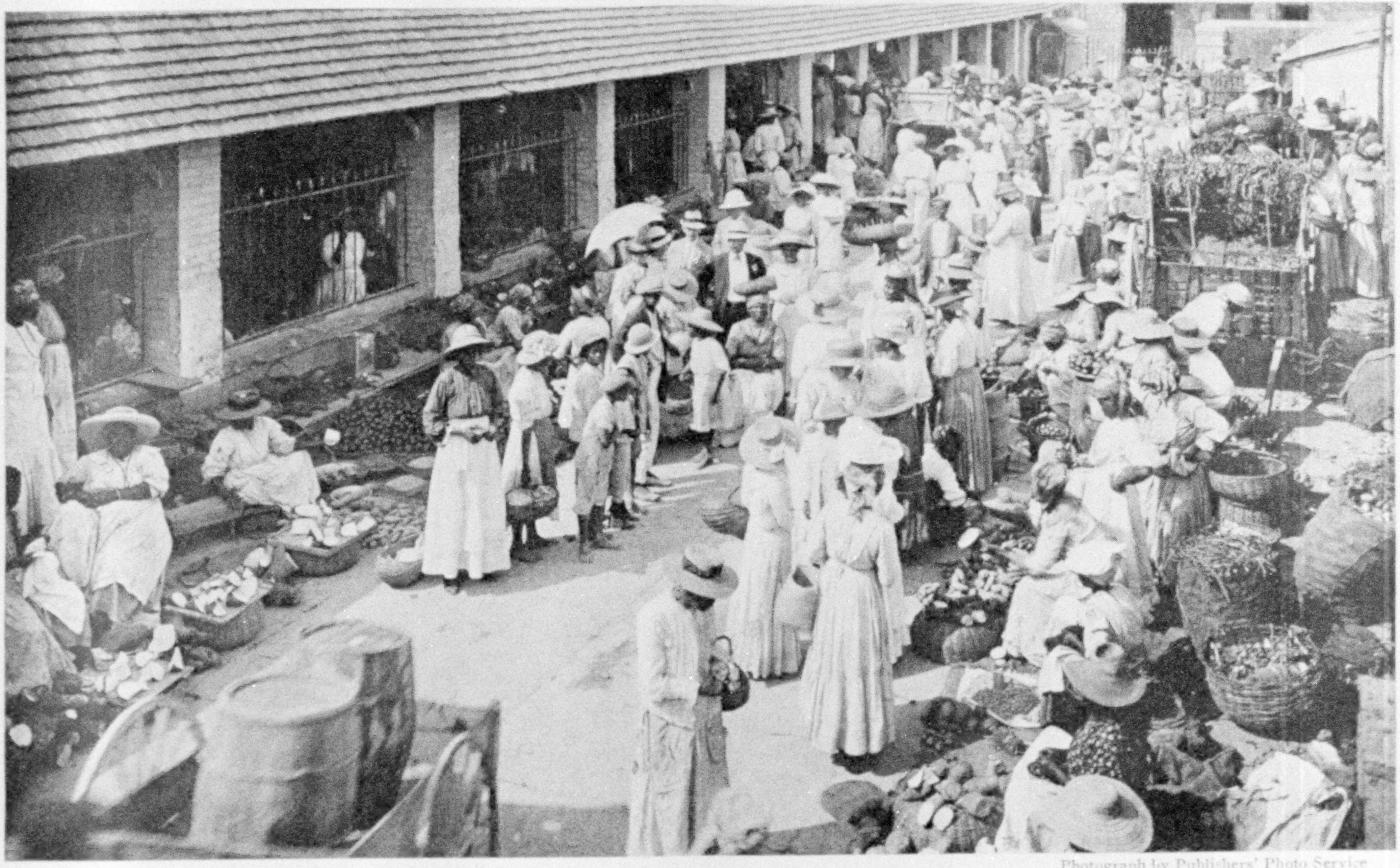
This was not to go on forever, for these pirates counted without the law of compensation and retribution. On June 7, 1692, with the Council of the Island in session, a tremendous earthquake shook Port Royal "from turret to foundation stone." In the Council Minutes describing the catastrophe it is reported that "in the space of two minutes all of the churches, the dwelling houses, and sugar works of the whole island were thrown down; two-thirds of Port Royal swallowed up by the sea; all its forts and fortifications demolished, and a great part of its inhabitants miserably either 'knockt o'th head or drowned.'"

A METROPOLIS OF THE OCEAN BOTTOM

Admiral Sir Charles Hamilton, of His Majesty's Navy, related that in 1780 the submerged houses far below in the green depths were still discernible; and Lieutenant Jeffrey, of the Royal Navy, declared that while surveying the channel between 1824 and 1835 he had repeatedly traced sites of houses—a miniature Atlantis.

In 1859 a diver engaged to do underwater repairs to ships in Kingston Harbor made a series of descents over the old city, reporting that the roofs of many of the houses were still above the encroaching sands of the harbor floor, and that many of them remained perfect after the earthquake, though covered by many fathoms of clear water.

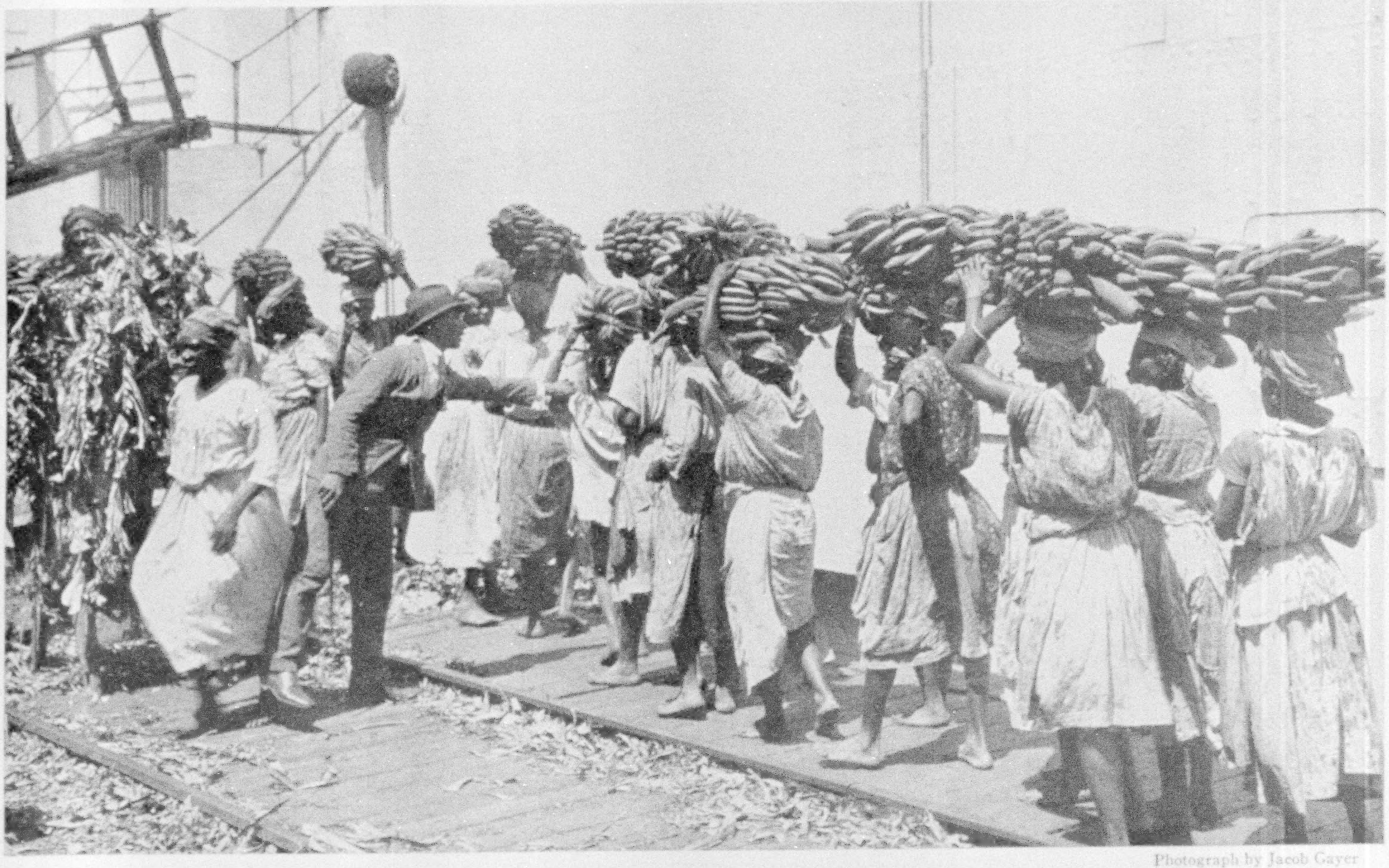
Yet the memories of Port Royal are not all of sordid pirate holidays and earthquake calamities, for West Indian wealth



Photograph by Publishers' Photo Service

CORNER OF THE JUBILEE MARKET, KINGSTON

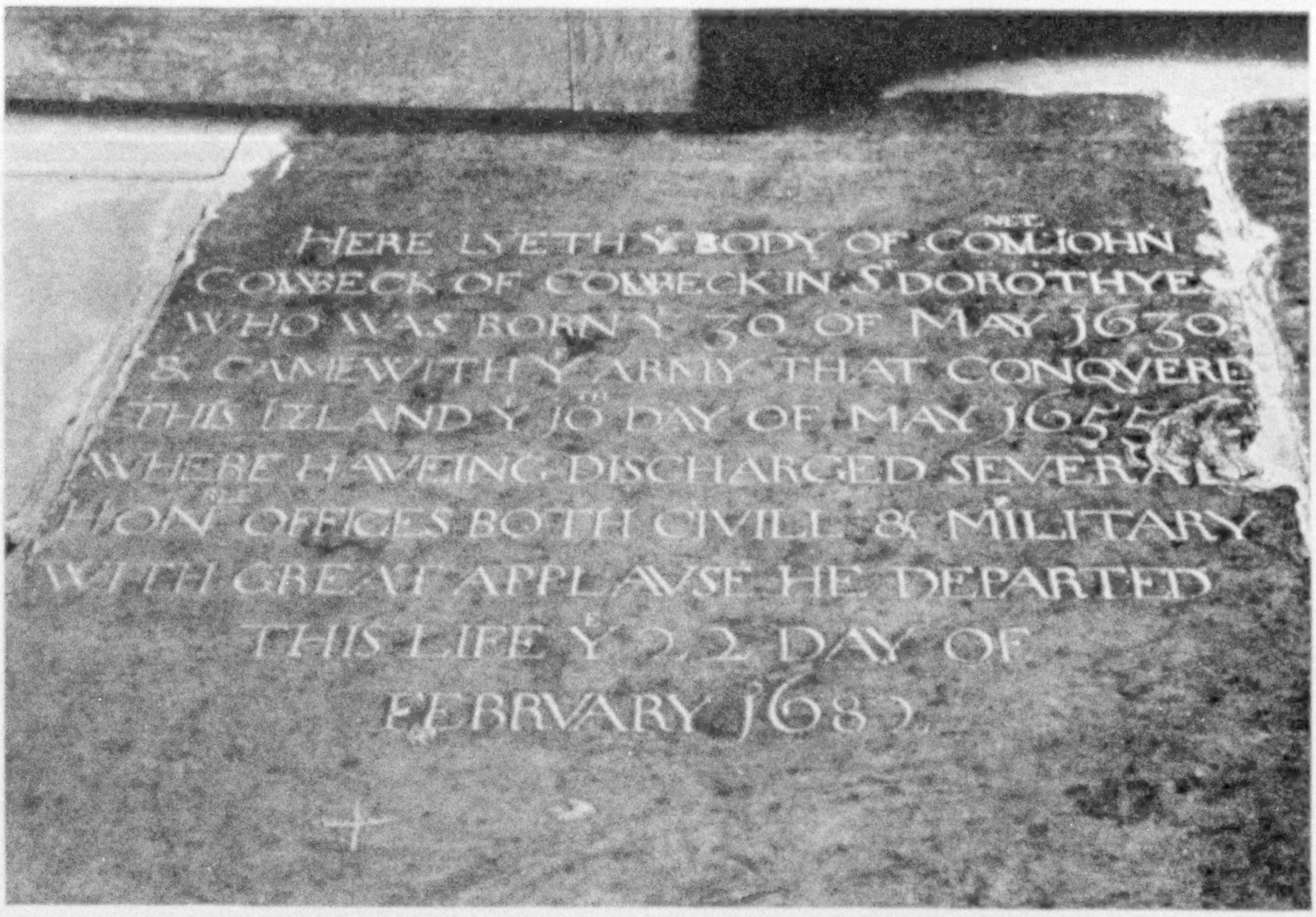
These market women are an interesting lot and are born traders. The amazing variety of home-grown tropical fruits and vegetables is ever a source of interest to visitors from colder climes (see text, page 16).



Photograph by Jacob Gayer

LOADING BANANAS FOR AMERICAN MARKETS

Women are able and willing for this work all over the island. They are paid by the bunch, not by the hour. A checker on lookout oversees their labor, and when one of the ebon damsels tries to finesse by walking around him into line again with the same bunch, and thus be credited twice for one load, he yanks her out, as seen in this picture, and everybody laughs.


HERE LYETH Ye BODY OF COLl. JOHN
COLBECK OF COLBECK IN St DOROTHYES
WHO WAS BORN Ye 30 OF MAY 1630
& CAME WITH Ye ARMY THAT CONQVERED
THIS IZLAND Ye 10th DAY OF MAY 1655
WHERE HAVEING DISCHARGED SEVERALL
HONble OFFICES BOTH CIVILL & MILITARY
WITH GREAT APPLAVSE HE DEPARTED
THIS LIFE Ye 22 DAY OF
FEBRVARY 1682

Photograph by Jacob Gayer

FROM EARLY DAYS OF ENGLISH OCCUPATION

The tombs of many of Jamaica's historic great are to be found in the interesting old cathedral at Spanish Town, the former capital (see text, page 18).

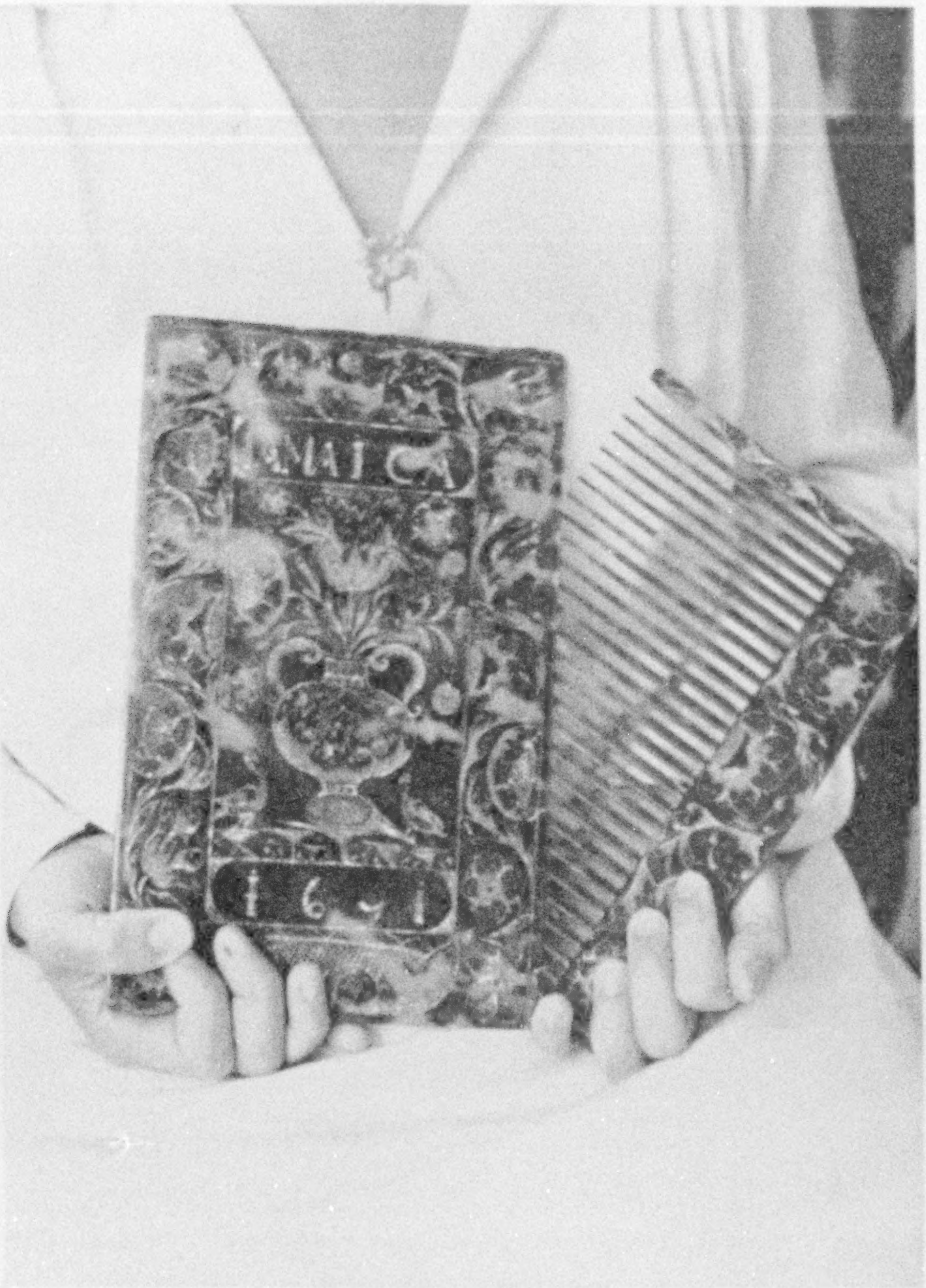
was invested in Britain's greatness before there was a British empire. Britain's navy, indeed, was founded by men who were trained to war and seamanship in waters of which Port Royal was the home station. The vessels sent out from there played no insignificant part in Britannia's naval history. "Port Royal was a toll-gate in Britain's path of admiralty at which many heavy fees were paid."

'Twas to Port Royal that the Welsh firebrand, Harry Morgan, returned as Admiral of the *Jolly Roger* after the sack of Puerto Principe and Puerto Bello and the Golden City of Panama, and this was his home port during his ravages against sail and city of the Spanish Crown from 1665 to 1672. Yet he was a man of his times, for, having been found guilty at last of black piracy and worse, he was taken a prisoner to England, where with his ill-gotten gold he bought his freedom and with more of the same managed to be knighted by King Charles II of dark memory, and returned to the playground of his infamy as Lieutenant Governor of Jamaica. Then this many-sided sea knight retired into official dignity and set about the business of promptly hanging on Gallows Point many a former shipmate when caught ashore, as an object lesson in "do as I say, not as I do."

From the *Swiftsure,* Admiral Penn's flagship in the daring expedition that won the island for Britain in 1655, to the *Formidable,* Lord Rodney's flagship of the fleet that confirmed the supremacy of English dominion there in 1782, the record of the Port Royal station is a brilliant one. Rodney sailed from England to uphold the power of his race against France and Spain, amid the sullen silence of the people of the homeland. A few weeks after his sailing a message was dispatched from Parliament commanding him not to fight. But fight he did and won before the message reached him; thus was England mistress of the Caribbean in spite of her orders that came too late.

On the 29th of April, 1782, Rodney returned to Port Royal with his fleet of nine prizes, including de Grasse's flagship, *Ville de Paris,* on which he had taken as a prisoner of war that redoubtable French seafighter, Admiral de Grasse himself. That huge vessel was the pride of Louis XV, and its flag had been lowered by Admiral de Grasse only when none but himself and a few seamen remained unwounded after a day's fighting. Thus had Britain avenged her humiliation of the year before at Yorktown, when the heroic de Grasse had aided Washington to achieve the independence of his country. So much for the necessary historical background of Jamaica's first real port.

But we must get back on our own journey toward Summerland. A brief sail brings us from old Port Royal to the dock at Kingston, the Jamaican capital, born of Port Royal's misfortune. For after the second great earthquake at Port Royal in 1692, followed by disasters of fire and hurricane, its people, fearing further revolt of Mother Earth, moved to the mainland and established Kingston, with its great harbor, nine miles long and about two miles broad.



Photograph from the Institute of Jamaica

THE VANITY OF A FREEBOOTER

If, as it is supposed, the Welsh firebrand, Sir Henry Morgan, owned this huge tortoise-shell comb, he probably wrested it from some Spanish damsel captured aboard a galleon or in the sacking of a rich city.

KINGSTON THE CAPITAL

As you pass overside and set foot on the dock there is a subconscious realization of change and a feeling that you are indeed in the Tropics, for the very atmosphere seems different and there are strange and not unpleasant odors of fresh fruit, spices, and the cloying smell of sugar. In the background wait groups of white-clothed figures, each crowned by nondescript headgear, from under which gleam black, smiling faces, bright eyes with an expectant look of the hope that springs eternal in the breast of the Afro-Jamaican that each arriving American is destined to be his banker, from whom he shall garner a latter-day piece of eight for some service rendered. The mob of expectant beneficiaries is held *in statu quo* without seeming effort by a lordly figure, smartly garbed in a black uniform ornamented with bright-red stripes as to trousers and topped with a white solar helmet. He sports a swagger stick of authority, representing His Majesty's law and order in the body and person of a Jamaican policeman of ebon hue!

© Publishers' Photo Service

A FULL LOAD

A coolie carrying bananas to the cars for transportation to shipping centers. Of a sturdy, wiry race, the East Indians work hard and save their wages for the great day that means they may return to India in comfort.

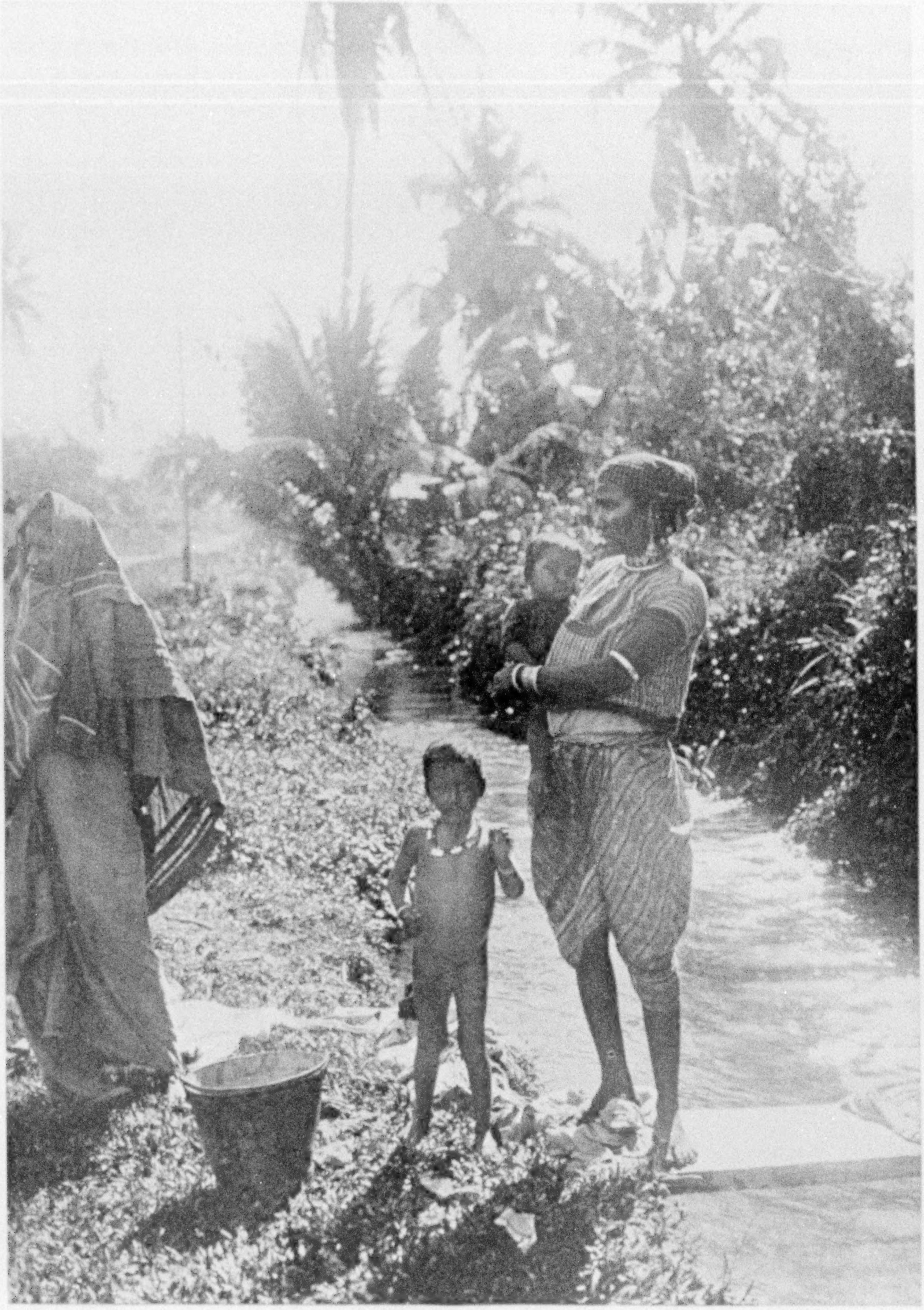
The customs officials are quick and courteous in their bird's-eye examination of the luggage, and out you step into the warm sunshine with the keys of the isle in your pocket in the form of travelers' checks or greenbacks. Then you are pleasantly startled by hearing yourself addressed from a dozen directions in a beautifully modulated and generally grammatical English: "Sir, may I have the honor of conveying you and milady to your destination? Your carriage awaits."

You recover sufficiently to grasp that the expert services of chauffeurs, surrey drivers, and baggage carriers are desirous of enlisting under your flag. It is well to accept their offer, for, although but a short distance from the splendid Myrtlebank and other smaller hotels, the voyager from the frozen north quickly realizes that El Sol is both high and hot, and, until one becomes acclimated, a few minutes' walk at sea-level brings the pearly gleam of moisture to the brow and a desire for the shady side of the street—if any!

GETTING LOCAL COLOR

To garner a maximum of enjoyment from a stay in Kingston one must know a good deal of her tragic history and romantic past, for the city, as such, does not rival Paris in beauty, even though creature comforts are at hand. Like most tropical settlements, Kingston has learned by experience that, while the skyscraper may be something to gaze at in wonder, its pride might descend with a Charleston step of Mother Earth. Therefore hewers of wood and stone use excellent judgment in constructing their rooftrees, both for business and home, hotel, or theater, quite near to the ground, so that the dwellers within, when an earth tremor comes, will not be put to the trouble of taking a high dive out of a window on the tenth floor and trusting to luck that a hay wagon is passing conveniently along at the important and needed moment!

Luckily there are seldom indications of earth nervosity these days and no one in Jamaica seems to give the subject a thought.



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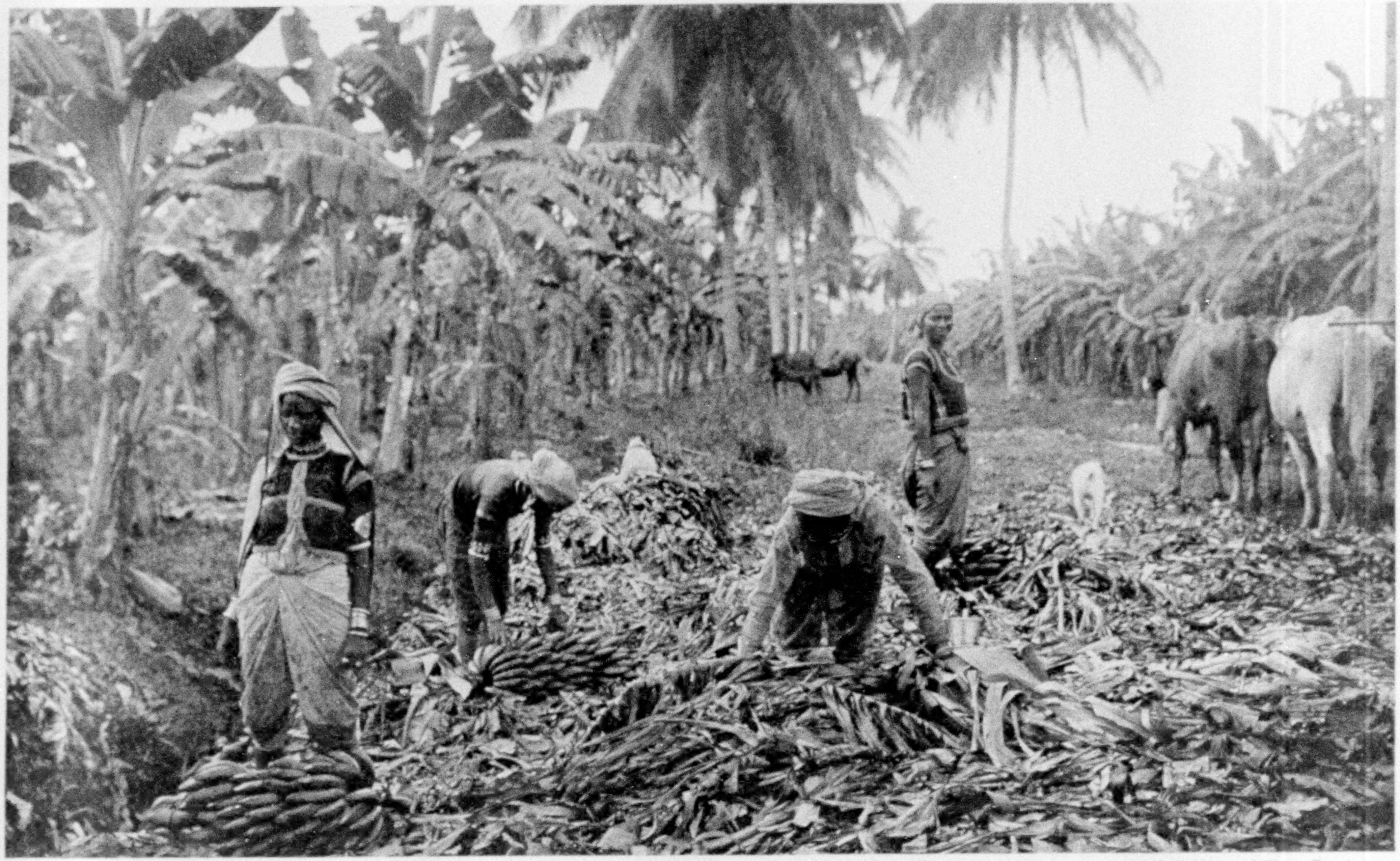
AN EAST INDIAN ATMOSPHERE

Since the beginning of East Indian immigration, in 1845, more than 36,000 contract laborers have been introduced into Jamaica; also about 1,200 Chinese. After some years of work and saving, many return to their native land. To-day upward of 23,000 Asiatics make their home and thrive in the colony (see, also, text, page 23).



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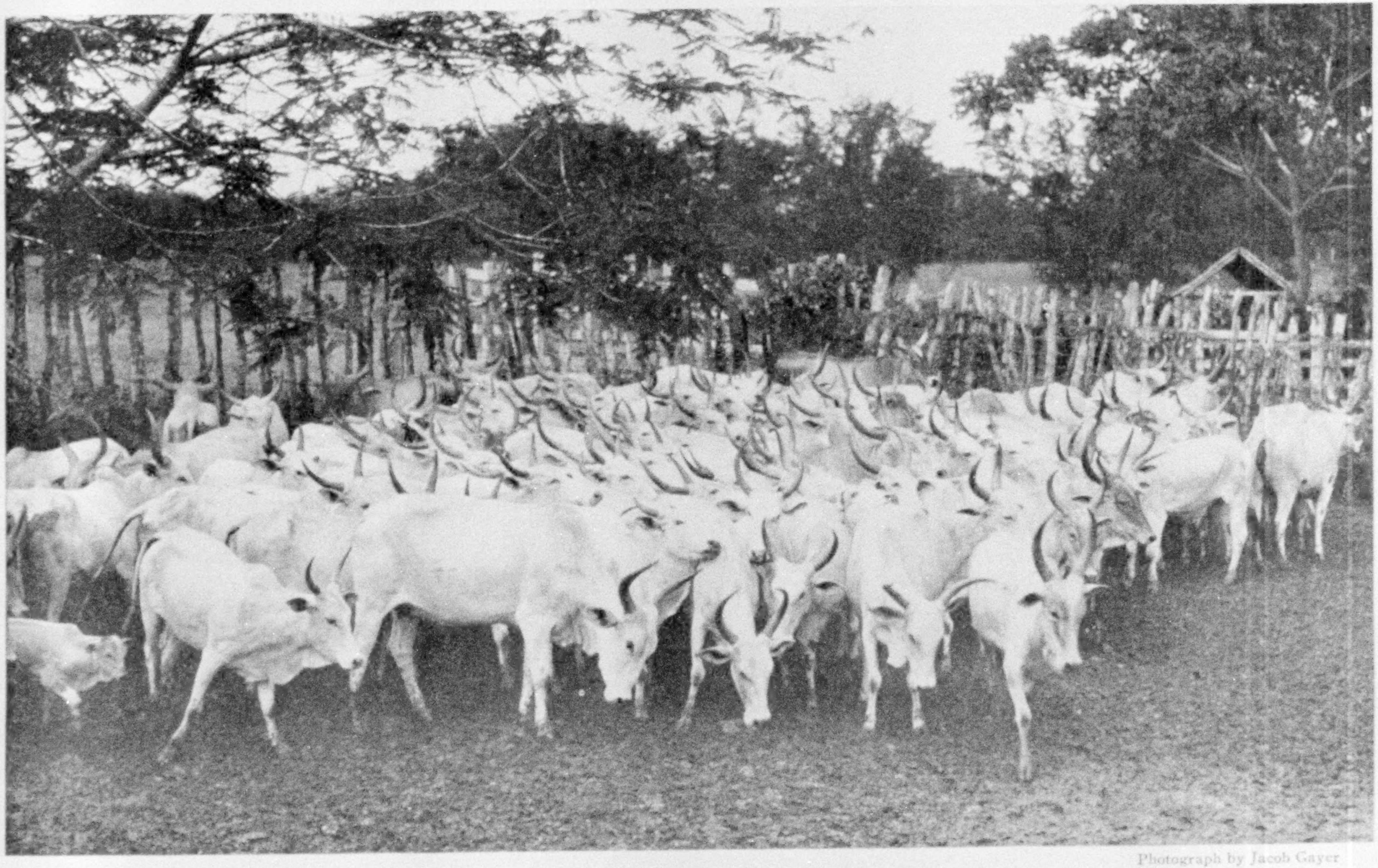
WHERE EAST AND WEST MEET

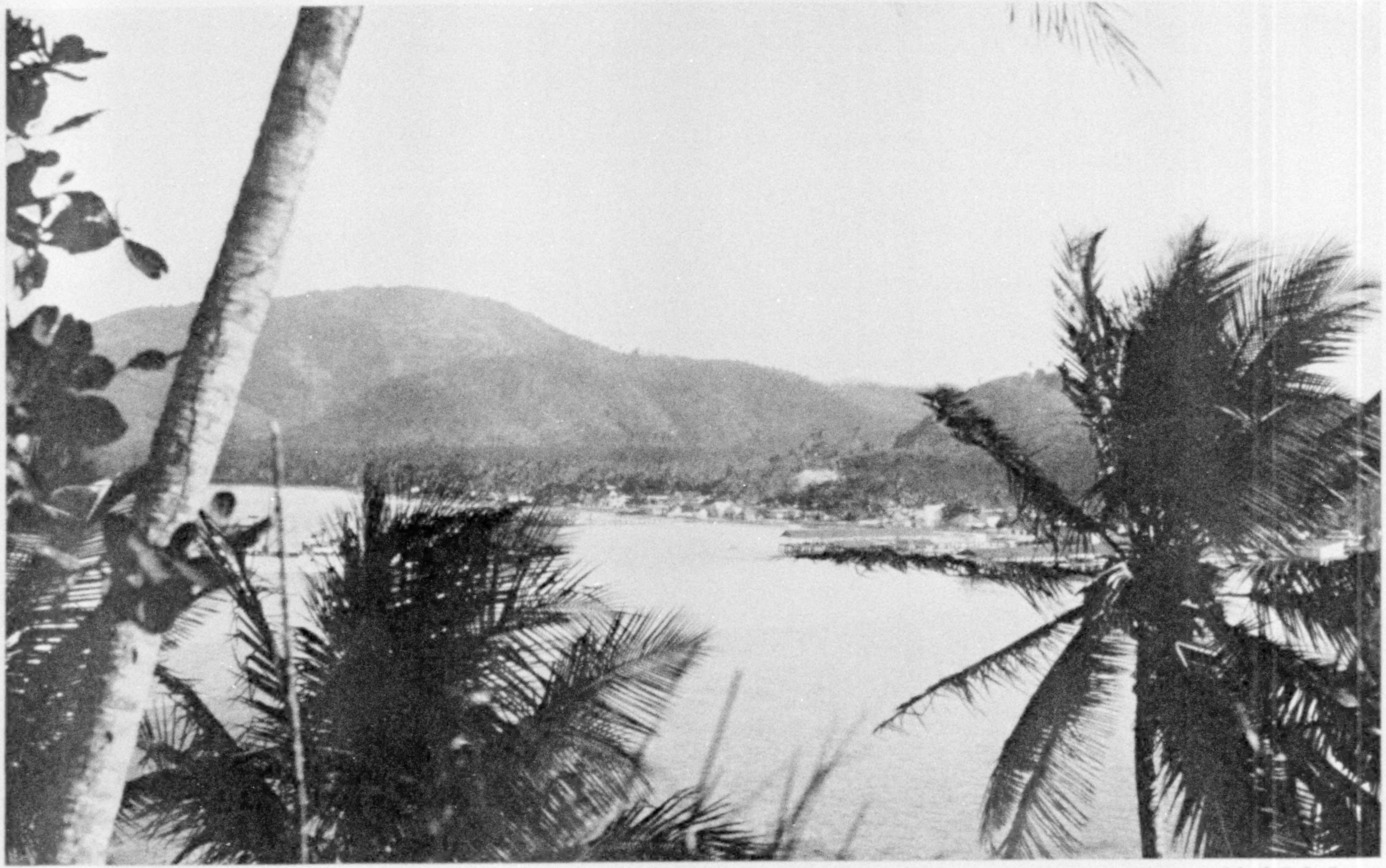
The East Indian coolie women dress in their brightly colored costumes and adorn themselves with silver bracelets, armlets, and anklets, as in their own country. Such ornaments are not left at home, but are, perhaps, better safeguarded about the person, even in the working field.



Photograph by Jacob Gayer

INDIAN CATTLE OF THE MYSORE STRAIN

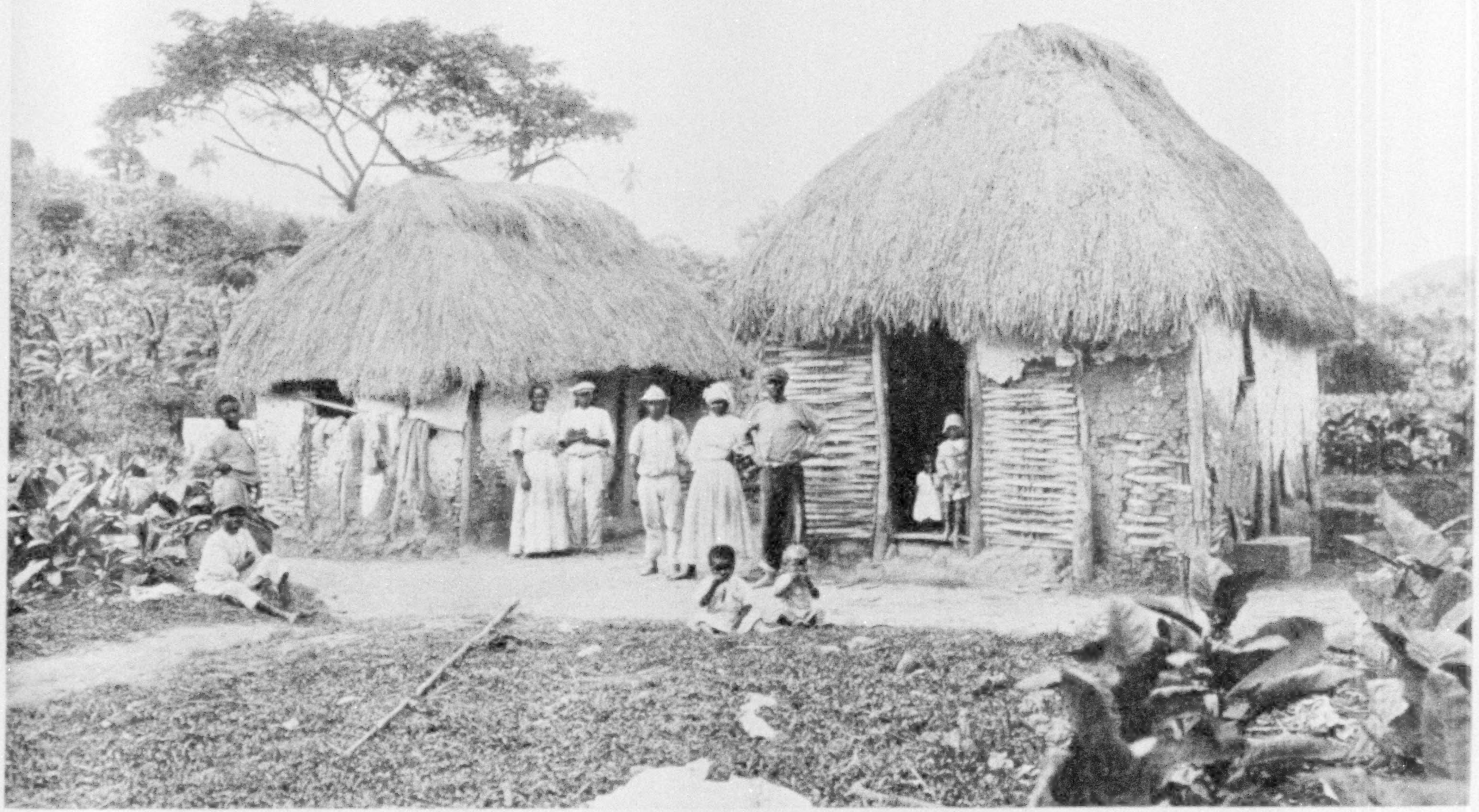
These tick-resisting cattle were first introduced in Jamaica in 1840. There is a herd of 3,000 of these cattle on an estate at Montpelier, where they are bred for use on sugar and banana plantations for draft animals. Many are annually exported, principally to Cuba (see text, page 40).



Photograph by J. O. La Gorce

PORT MARIA, WHERE MOUNTAINS AND SEA MEET

Located in the lovely St. Mary's Parish, the little town of Port Maria is a busy shipping port for bananas and coconuts (see text, page 31).



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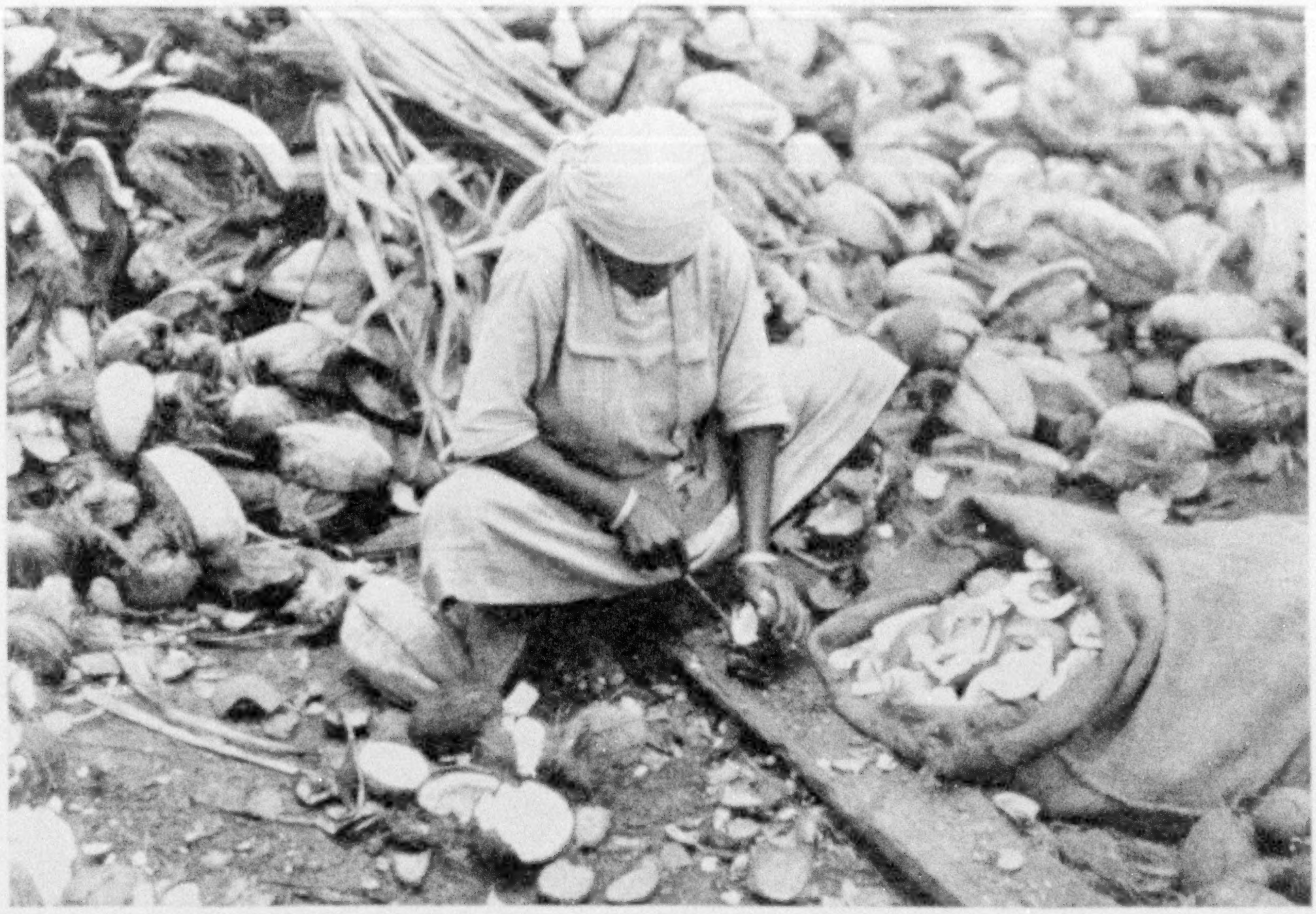
HUMBLE, YET HAPPY

The negroes here, as elsewhere in the West Indies, are a happy-go-lucky people, to whom work is but a necessary evil and a means of obtaining additional necessities or creature comforts.



Photograph by Jacob Gayer

COPRA—A VALUABLE PRODUCT

The dried meat of the coconut is known as copra, a Spanish adaptation of the Malay *koppara*. From it is extracted a valuable oil used in the manufacture of marine soap, that forms a lather in sea water. The meaty residue, after the oil is extracted, is used for making candles.

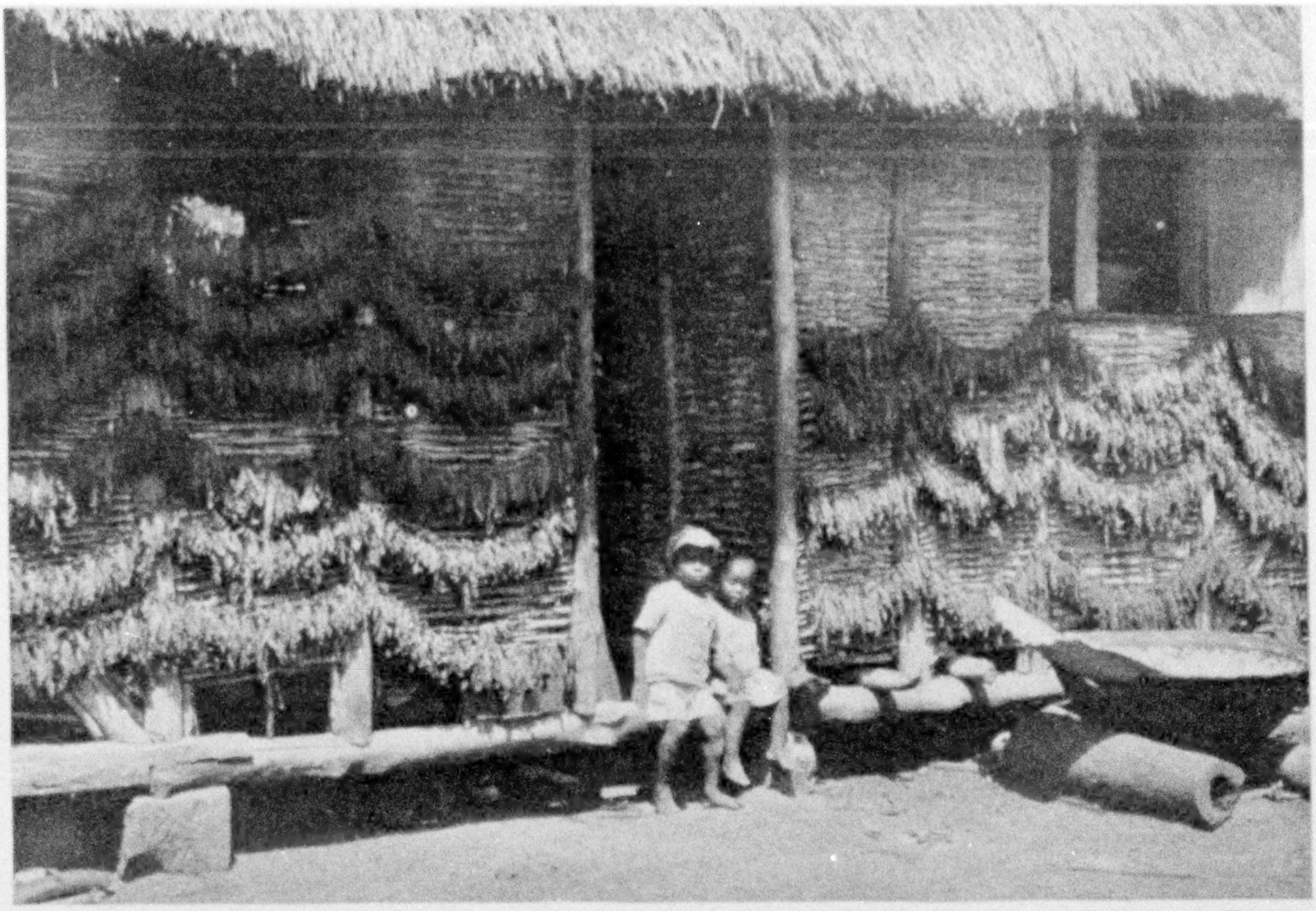
Kingston is the center of island activity from the standpoint of both government and business. The streets are clean, well ordered, and dotted with traffic officers, for even in this Garden of Eden the fiery gasoline steed races its way about. The shops are many and varied, and those catering to the white trade have excellent qualities of merchandise, home-grown as well as imported from England.

There is no bargaining in these first-chop emporiums, for the prices are fixed and fair and you are waited upon by grave-miened colored clerks who have all the suavity and dignity of a Regent Street draper. It is a different story, however, in the cheaper stores, for in this stratum bargaining seems to be the natural order. Half the first price is the real selling figure, but you will not get the goods at that unless you start low. Finally, if you don't tire before the salesman does, you get your desires at 50 per cent of his first price.

Visitors in foreign climes usually feel it necessary to visit the market place; why, no one really knows, but here it is worth while. The market women are a cheery lot, and while displaying their small stock of really tropical products—pepper pods, cocoa, sour sops, breadfruit, mango, pimentos, and "jackass rope," as native tobacco is termed, together with a score of fruits and vegetables unknown except by name to the northern visitor—they carry on a cross-fire of good humor. They can spot a Yankee with the eye of a sharpshooter, and will smilingly assert that they "love America" and that you would "look most handsome in one of the fine Jipijapa straw hats!" (see page 6).

All sorts of strange things are offered here, from a shark's backbone strung on metal and turned down until it is fashioned into a cane, lace bark whips—the butt and long plaited lash made from one piece of wood—to dagger-work fans, coolie bangles, and fern albums, and few visitors can long resist the salesmanship of the native Jamaican in her own market.

The island was rich in native woodworkers especially skilled in furniture-



Photograph by Jacob Gayer

YOUNG GUARDIANS OF JACKASS ROPE

The natives call the island-grown tobacco jackass rope, probably because it is strong and tough (see text, page 16).

making a generation or two ago. Its wealth of hardwoods, especially mahogany, produced a plentiful supply of raw material, but the skilled carvers could not compete with the cheap importations from the United States and the art, as such, has dwindled and is practically dead to-day.

THE CHARM OF THE ISLAND COUNTRYSIDE

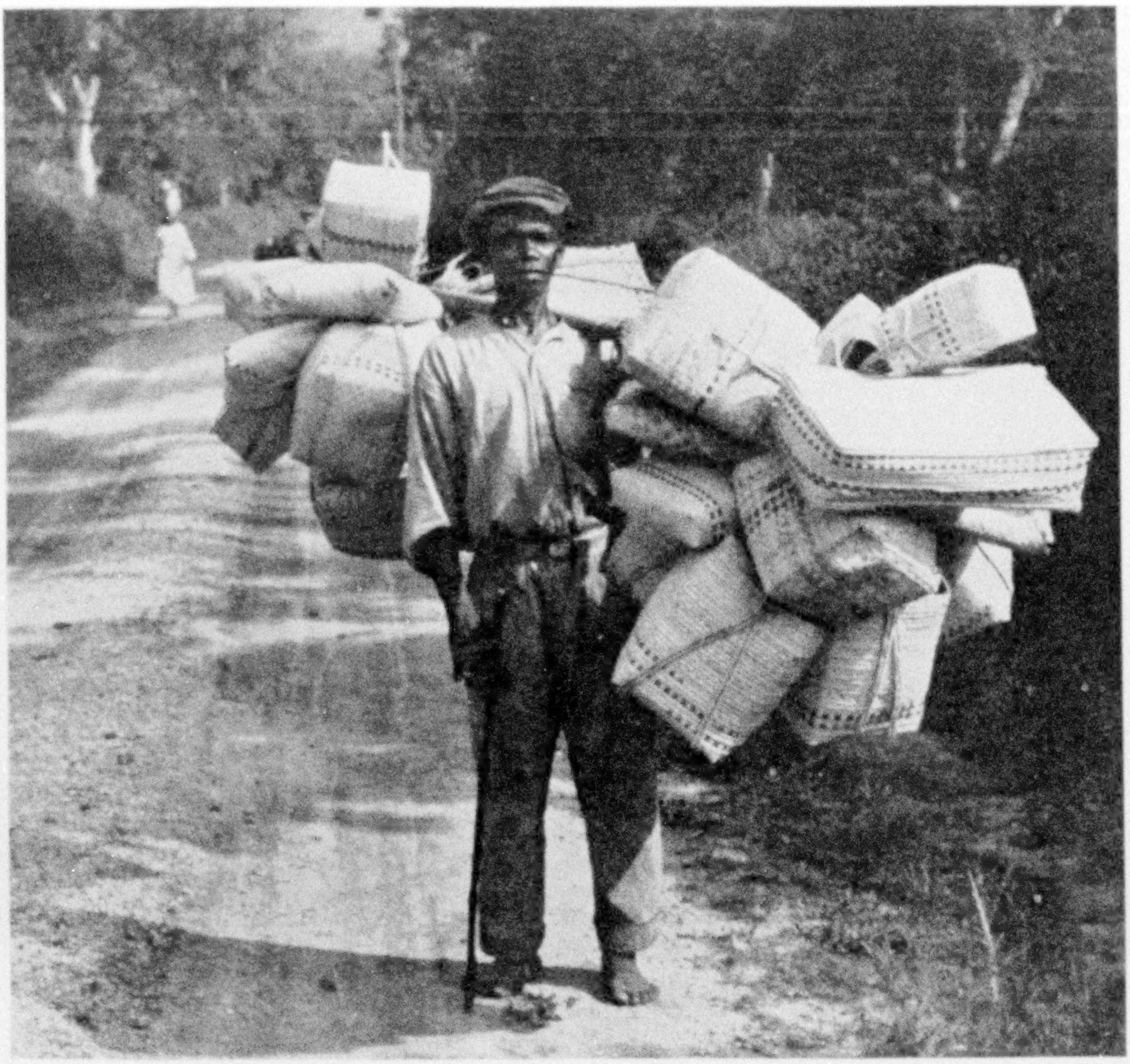
The duty of seeing the market over, it is a joy to step into a "buggy," as the horse-drawn taxi is locally known, and ride out into the suburban area, where the odors of tropical fruits and flowers and the songs of brightly colored birds are welcome after the turmoil of the marts of trade, and if interested in human nature one can learn much of the humble life of the island by encouraging his Jehu to talk. He is generally willing if you don't make fun of him or his island home.

We pass the lordly Myrtlebank Hotel, fronting on the beautiful harbor, with its tropical architecture, its enticing gardens, shade, and creature comforts—both liquid and solid—and presently are driving up South Camp Road. What lovely little villas and bungalows, each with its own rose-embowered gate and its own winsome name! Far ahead rises Blue Mountain Peak, back of you the azure Caribbean, to your right a broad marine plain, and to your left the white and green capital city.

The sun shines hot, but the Doctor comes valiantly to your relief. Don't know the Doctor? Well, every Jamaican loves him. For he is the fresh wind that blows from the sea to the Blue Mountains every day—a sort of perpetual electric fan, whose breezes temper the white sunshine.

At night the Undertaker takes the Doctor's place — a cooling wind from the mountain. But the Undertaker deserves no such lugubrious name. Perhaps he is the victim of that same superstition that used to tell us that we must shut the night air out of our sleeping apartments on the theory that it was "poisonous." At any rate, he is a great friend of the American traveler, for if you get a room that faces the Blue Mountains the Undertaker will assure you a cool night.

The British Government has con-



Photograph by Jacob Gayer

A NATIVE BASKET MAKER EN ROUTE TO MARKET

His wares are well made and attractive. They can be purchased, filled with tropical fruit, in the markets for a shilling or two.

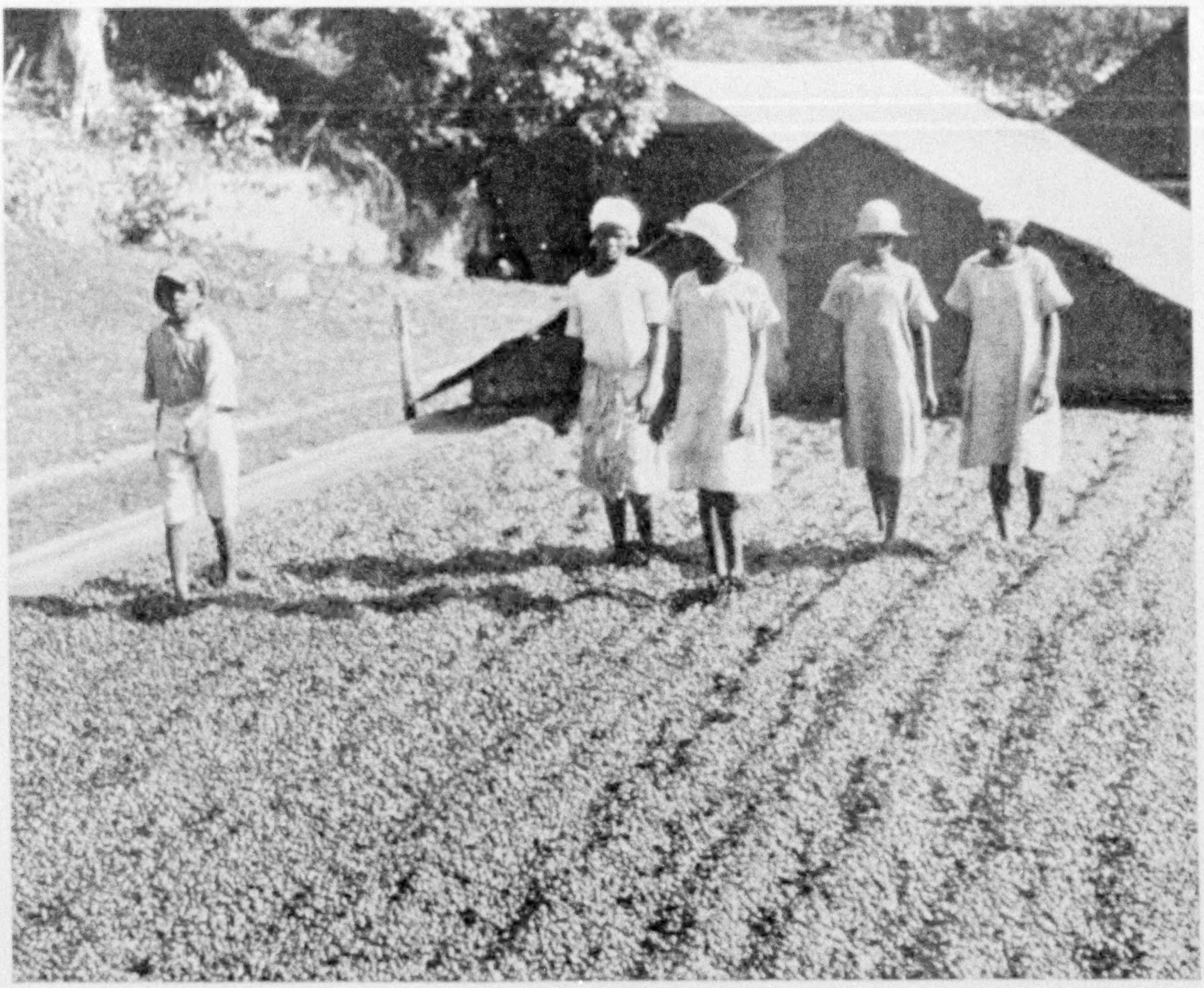
structed what are considered the best public buildings in the West Indies to house its activities in Jamaica.

The King's House is not in Kingston proper, but about 4 miles out on the highway leading from Matilda Corner to Half Way Tree. It is built of reinforced concrete and situated in grounds 177 acres in extent, a large part of which has been transformed by the landscape gardener into a tropical wonderland.

The public buildings of the colonial government occupy two blocks on King Street and were designed by Sir Charles Nicholson. They represent the best of British architecture modified to suit tropical conditions.

The Institute of Jamaica, with its library of colonial literature and its museum of zoölogical and botanical specimens, is doing its best for the preservation of the valuable historical collections of the island. Among the interesting relics preserved is the bell of the old church of Port Royal, salvaged after the great earthquake of 1692. The Institute houses also an interesting series of oil portraits of Jamaican governors and colonial heroes (see page 41).

Yet, to the lover of the mellow-with-age and the historic through association, it is at Spanish Town rather than in the present capital's public buildings that one finds the greater charm. The old House of Assembly, surviving the days when representative government existed in the island; the



Photograph by Jacob Gayer

CLEANING CACAO BEANS (SEE, ALSO, COLOR PLATE II)

After the beans have been removed from the pods they are put to ferment for a few days and are then sunned and cleaned. Cacao beans are covered with a slimy substance aptly termed "muck," and this is removed in the manner shown in the picture. Children shuffle back and forth through the beans, the muck coming off on their feet.

Rodney Memorial, erected to the memory of the stout sea warrior who laid the foundations of British naval prowess that later took command of the seas at Trafalgar; the Court House, and the old King's House, which was founded in 1534, awaken memories of the stirring era in which the old capital was more than the official seat of a colony—of the day when it was the center of British dominion in the New World.

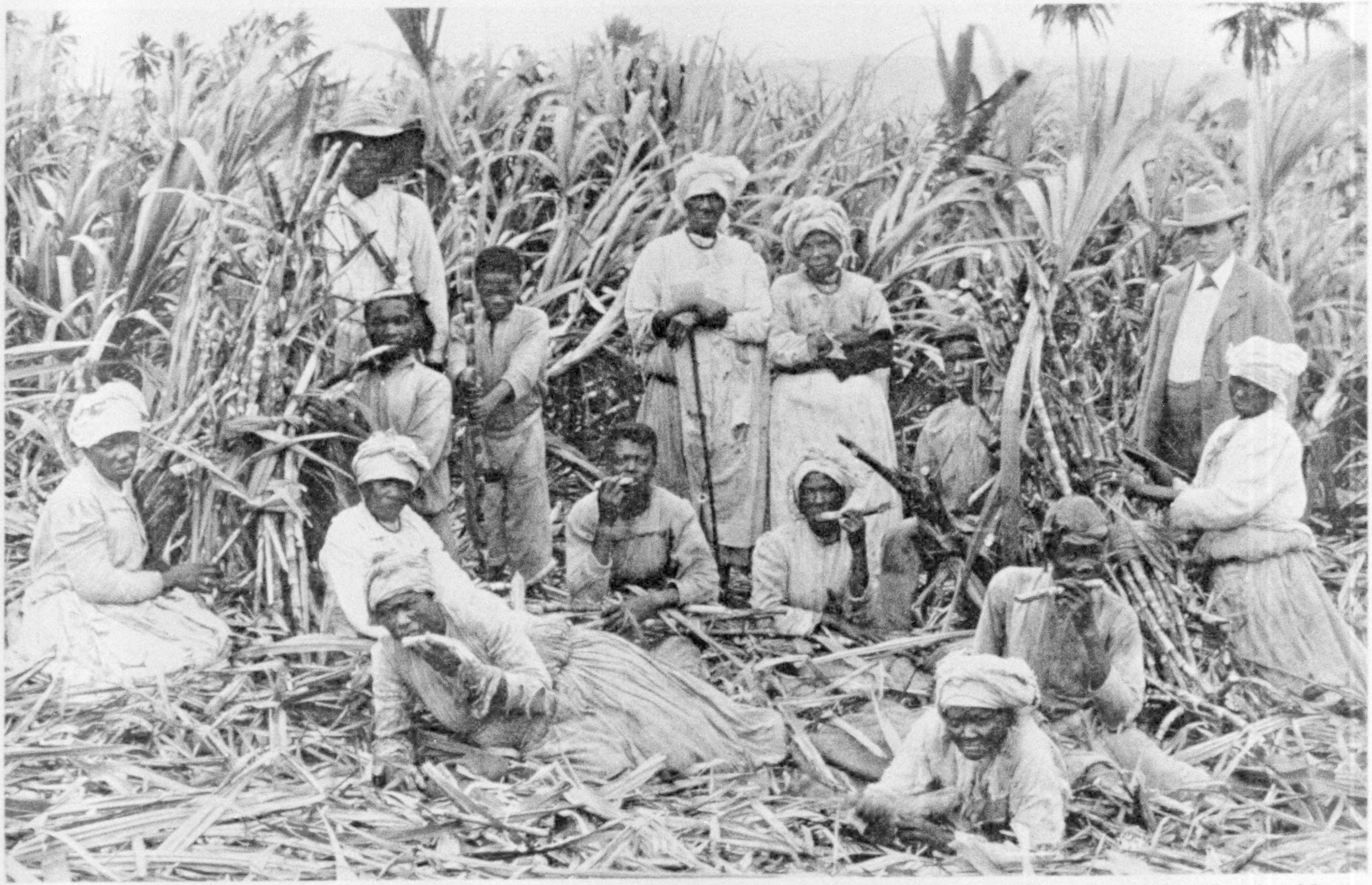
THE ISLAND PEOPLE AND THEIR GOVERNMENT

One does not drive around the environs of Kingston very long without noticing that most of the inhabitants are negroes. Even then he is hardly prepared for the statement that of the 860,000 inhabitants of the island only 15,000 are white people.

Both statistically and socially the negroes are subdivided into blacks and "colored," the former being of pure negro blood and the latter having an admixture of white blood.

Of the nonwhites 160,000 are of mixed blood and 660,000 are of native African descent. The former hold the minor white-collar jobs in the island because most of them have a better education and appearance than their ebon brethren.

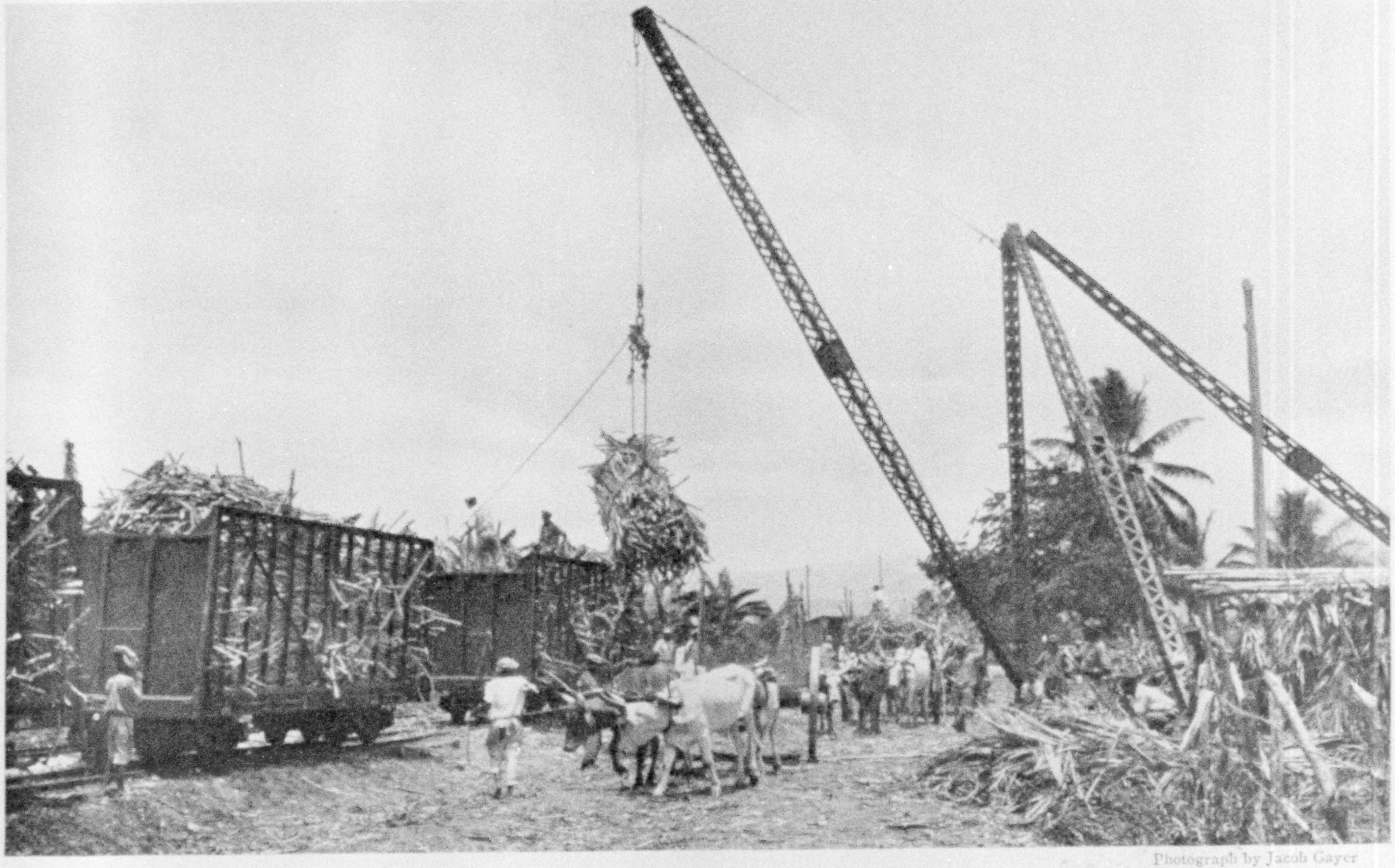
Yet, for all the disproportion of nonwhites, the white population governs. The British have very cleverly solved the situation which once threatened to overturn things in the island. They let the blacks and colored people have a certain representation in the Legislative Council, but rest the final control in the hands of the whites so thoroughly that British rule is never menaced.



Photograph by A. Duperly and Son

NATURE PROVIDES LUNCH IN THE CANE FIELDS

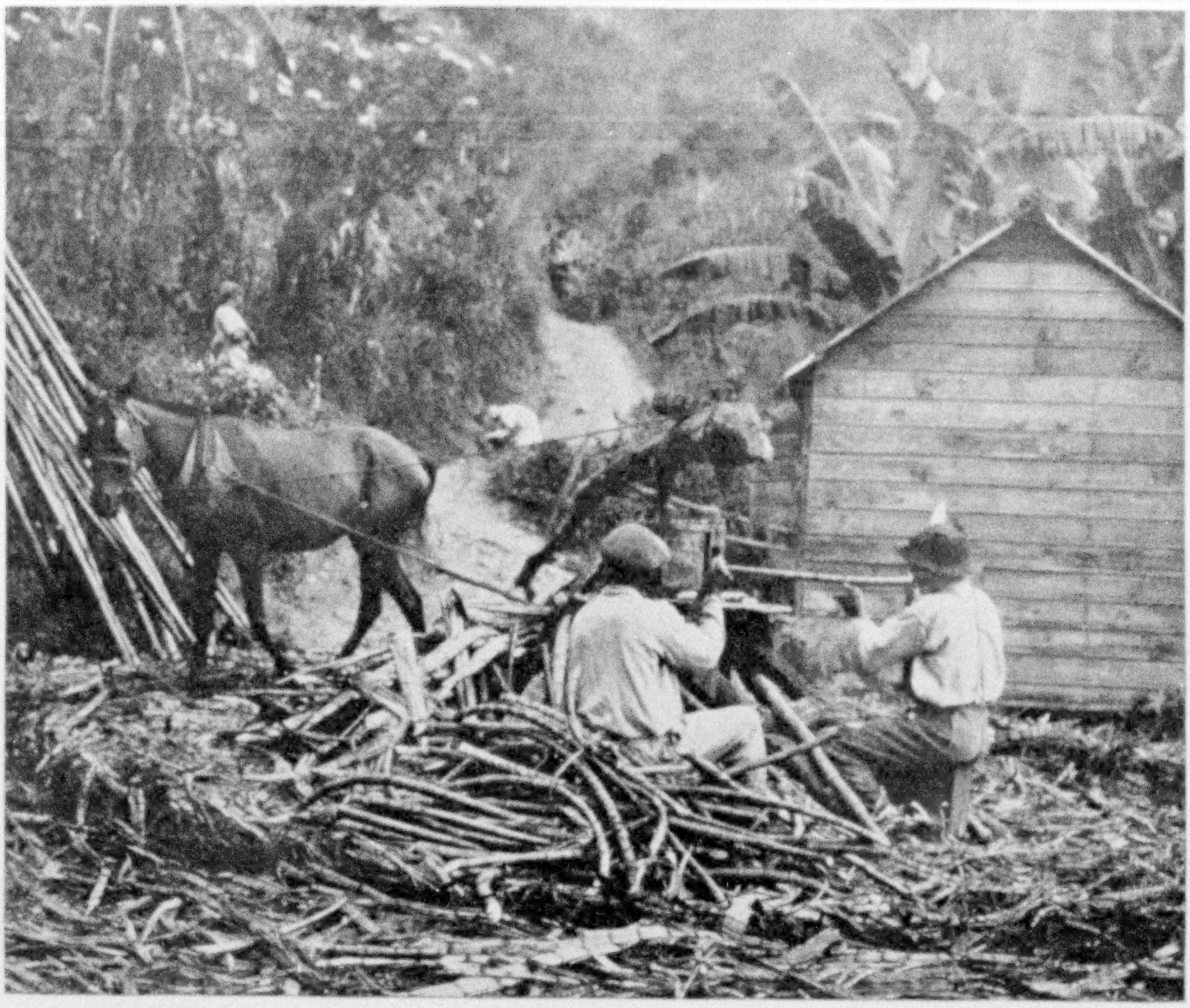
Sugar cane is really a staple food for workers in all countries where it grows. Having fruits, cane, rice, corn, and an abundance of fish, the natives of Jamaica do not need much meat.



Photograph by Jacob Gayer

LOADING SUGAR CANE TO BE TRANSPORTED TO THE "CENTRAL"

Modern methods for handling huge crops are employed on the large plantations, even though the cost of human labor is not high. This is generally true throughout British colonies.



Photograph by Jacob Gayer

A PROSPECTIVE SUGAR KING NEAR BUFF BAY

Many little patches of cane are worked by the natives for home consumption.

In 1865, after a negro outbreak at Morant Bay, it was decided by the British that thereafter there should be no legislative assembly, but that the powers of government should be reposed in the English sovereign.

Thereunder is a Governor, a Privy Council, and a Legislative Council. The Privy Council, as well as the Governor, is appointed by the King of England. The Legislative Council is made up of the Governor as President, five *ex officio* members, ten appointed members, and fourteen elected members. Thus the white majority in the council, coupled with the veto power of the Governor, insures that, even if all of the fourteen elected members were blacks, the whites would still be in control of the island administrative affairs.

By this arrangement the negroes can always have the fun of the political game without harm befalling the island thereby.

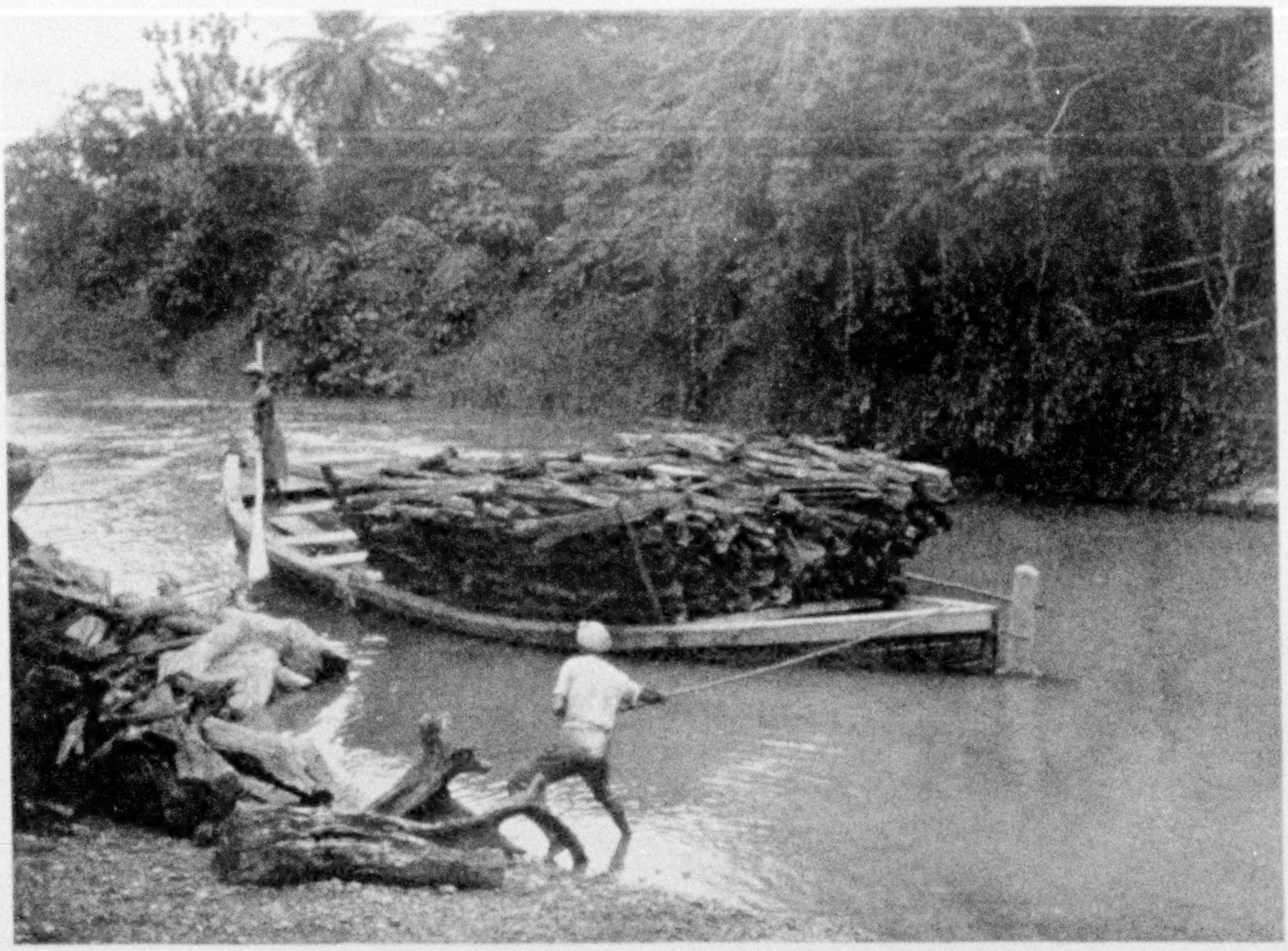
Slavery was abolished by the British Government in 1834, as those who sometimes sit in judgment of that empire should remember, and the slaveholders recompensed for the loss of their serfs.

The immediate results of this voluntary manumission in Jamaica were no better than those of war-enforced emancipation in our own South, however; for, little knowing how to use their new-found freedom, the erstwhile slaves settled down to such irresponsible idleness that agriculture, the one big industry of the island, was almost paralyzed.

Most of the bigger planters, foreseeing the deluge of idleness that would follow, sold their lands at a sacrifice and, taking their wealth with them, returned to England for good.

The poorer planters were not able to follow suit, and the ensuing years saw them struggling along with idle people all around, but labor unattainable.

To remedy these difficulties, the gov-



Photograph by Jacob Gayer

THE BASIS OF DYES

A boatload of logwood on the Black River near Lacovia (see, also, Color Plate VIII).

ernment undertook the importation of coolie labor from the East Indies and, with these coolies as a nucleus, began the rehabilitation of agriculture. Many of the East Indians are still there, and surely their lot is greatly improved when compared with that of their fellows in their own overcrowded land (see pp. 10 and 11).

As the years passed, the freed negroes began to discover that, even in so rich a modern Eden as is Jamaica, some work is required if one is to eat regularly; and the urge of hunger, among other things, brought them back into the cane fields, sugar mills, and rum stills.

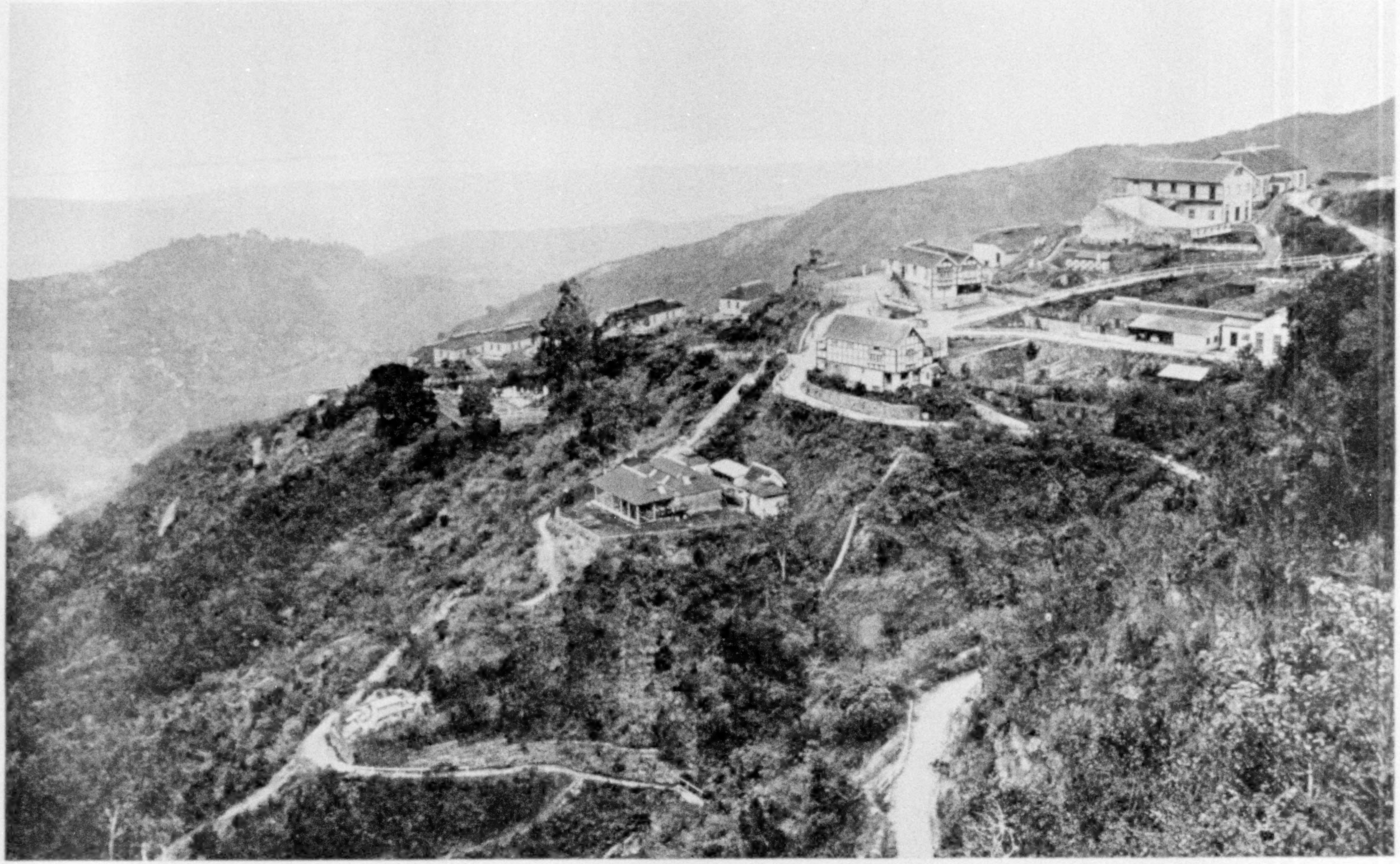
However, the necessities are so few in the eyes of the rural Jamaican negro, and the *dolce far niente* appeal so persuasive, that he is able to exist with comparatively little exertion.

So, on the island in general and in the rural sea-level districts in particular, the urge of existence does not call for steady labor the year round.

House rent demands no place, generally speaking, in the rural-dwelling Jamaican black's budget. He can build his own home of heavy grass and thatch it with banana leaves, or he can make it of mud and thatch, with cobbled floor. The more prosperous among the natives build wood houses out of old packing cases, scraps of cast-off corrugated roofing, flattened kerosene-can tin, and the like. Tropical vines soon hide the patchwork, for Dame Nature is a great healer of scars.

Nor is clothing a pressing problem with the rural blacks. The children may run naked during the tender years. The womenfolk dress in cotton gowns, which they wear as long as there is a piece left, barring Sundays, when they appear neatly and becomingly attired, and those occasions when they go into the city to market. The men wear long cotton drawers or the remains of trousering, shady shirts, and battered, frayed straw hats; but, in good sooth, who cares?

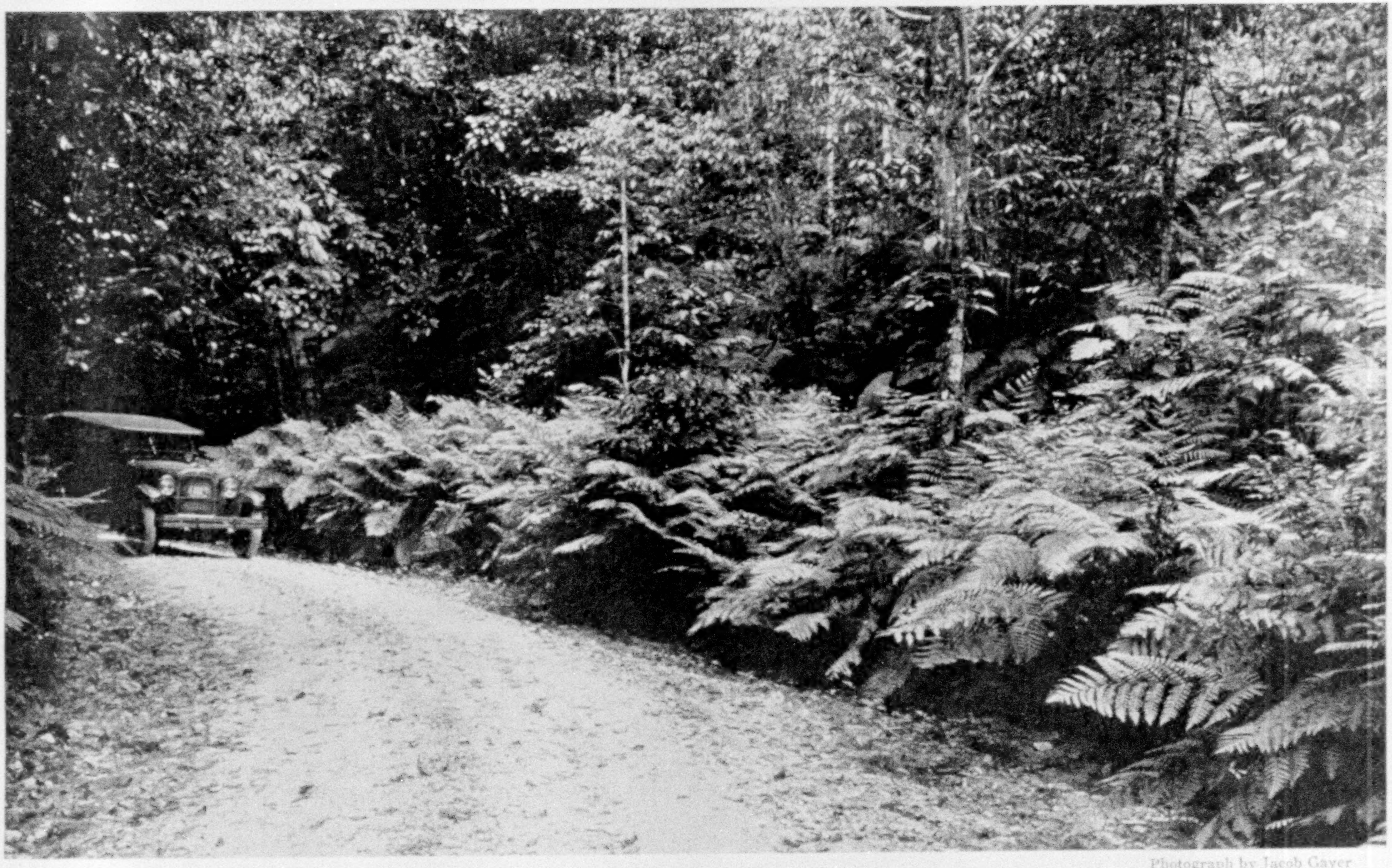
Now and then in passing along the roads one has a flash of a turbaned figure of the East, or his shy womankind in head scarf, with silver ornaments on arm and



Photograph by Publishers' Photo Service

NEWCASTLE, A POINT OF VANTAGE

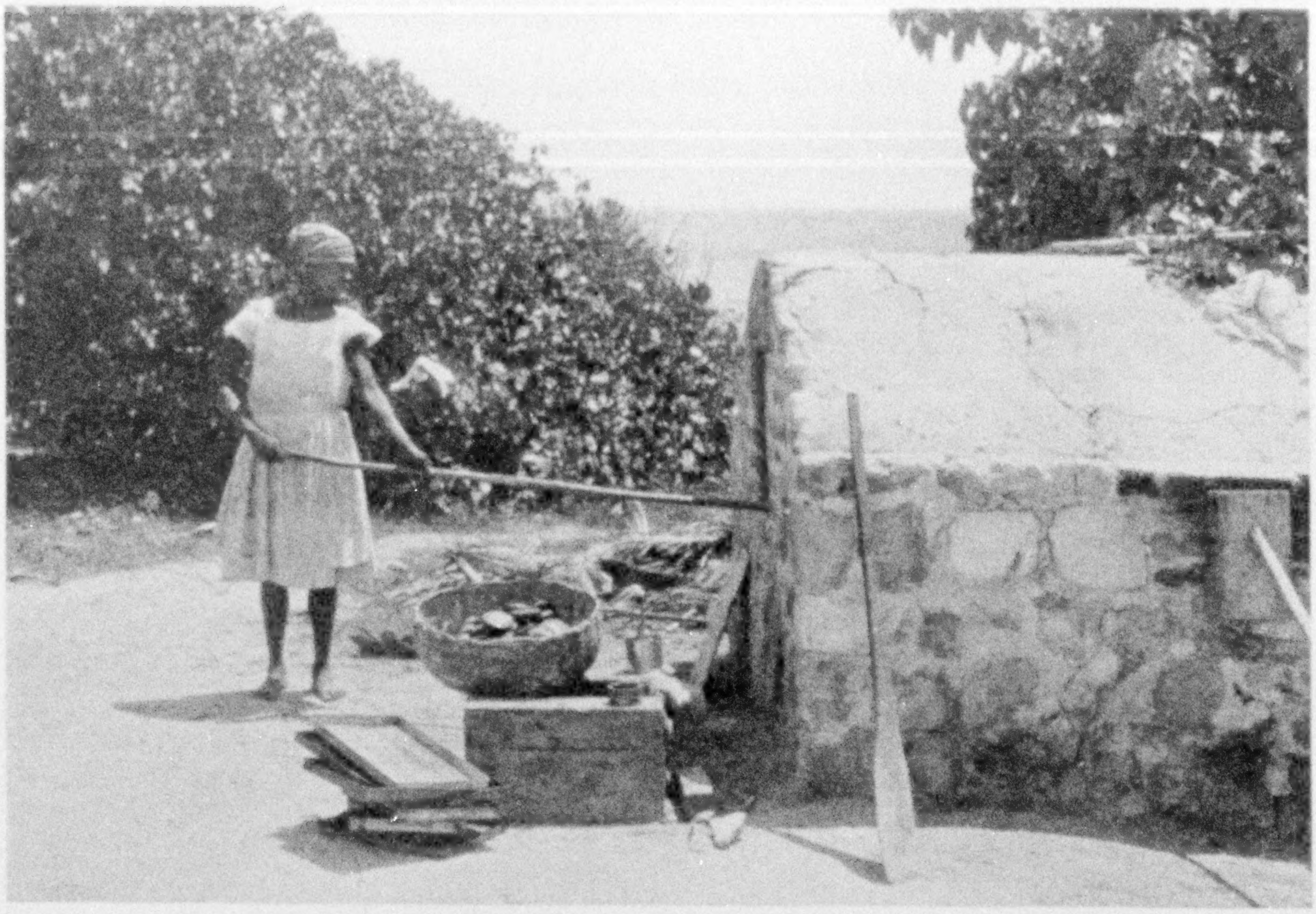
Beautifully located on a summit 3,000 feet above the Caribbean, this resort is much frequented by residents of the isle in summer and by foreign visitors during their winter stay.



Photograph by Jacob Gayer

A FAR-FAMED BEAUTY SPOT

En route to Moneague, in the Parish of St. Ann, is situated the remarkable forest glade called by the unromantic name of "Fern Gully." Deep between the high hills one passes through several miles of amazing ferns that fringe the road. High tree ferns shelter a profusion of silver fern, maidenhair, trembling filmies, and others of the fern family.



Photograph by Jacob Gayer

AS THE JAMAICAN HOUSEWIFE BAKED A CENTURY AGO

Customs do not change greatly among the humble people of the island; thus they bake their bread and cakes to-day as of old.

ankle and now and then a nose jewel, giving a touch of oriental atmosphere to the mellow scenery.

SIDELIGHTS OF NATURE

With less than 2 per cent of the population white and with living conditions so easy, it may well be imagined that the rural Jamaican negro has comparatively little inner urge to lift him above the Gold Coast outlook of his ancestors, and that he is about the most care-free, happy-go-lucky human being in the world in spite of public schools.

Even in his ancient proverbs we read of the perpetuation of his past in his present, and his religious ceremonials are now and then a strange admixture of barbarian rites and Christian practices.

"Cho," meaning chore, "too much boderation" is the way the older rural Jamaican black puts it, as he leaves the care of his patch, the gathering of his food, and the collection of the little fuel required for cooking to his womankind.

"Tek time get dey to-day" is the Jamaican's equivalent of "more haste, less speed." "Greedy choke puppy" is his way of telling his children that if they eat too fast they will choke.

"When black man tief, him tief half a bit; when bockra tief, him tief whole plantation," is his way of saying that a negro is a petty thief and a white man a big embezzler.

"Darg hab liberty fe watch gubnor" is his equivalent of a cat may look at a queen, while "Behind darg it is 'Darg'; before darg it is 'Mr. Darg.'" is his way of saying he pays homage only when he has to.

"When fish come out o' sea an' tell you alligator hab feber, belieb him"; "Rocktone a riber bottom never know sun hot"; "If snake bite you, you see lizard, you run"; "Coward man keep soun' bone"; "Braggin' riber neber drown s'mody"; "One finger can't catch louse," are samples of Jamaican philosophy in native lingo.

With the advance of education, the use of such homely proverbs has tended to lessen, and, if you ask him to explain one you hear, the Jamaican black will prob-

© Duperly and Son

A POPULAR BOULEVARD

With a population of more than 800,000, the hundreds of miles of roadways which the island maintains are thronged every day.

ably reply with smiling dignity, "That is but an olden-time saying, sir."

The building of the Panama Canal afforded the Jamaican negro an opportunity to earn some money, and at the same time to see what he thought was quite a bit of the world. During the construction period almost every ship that sailed from Kingston to Colón had its quota of workmen bound for the Canal Zone.

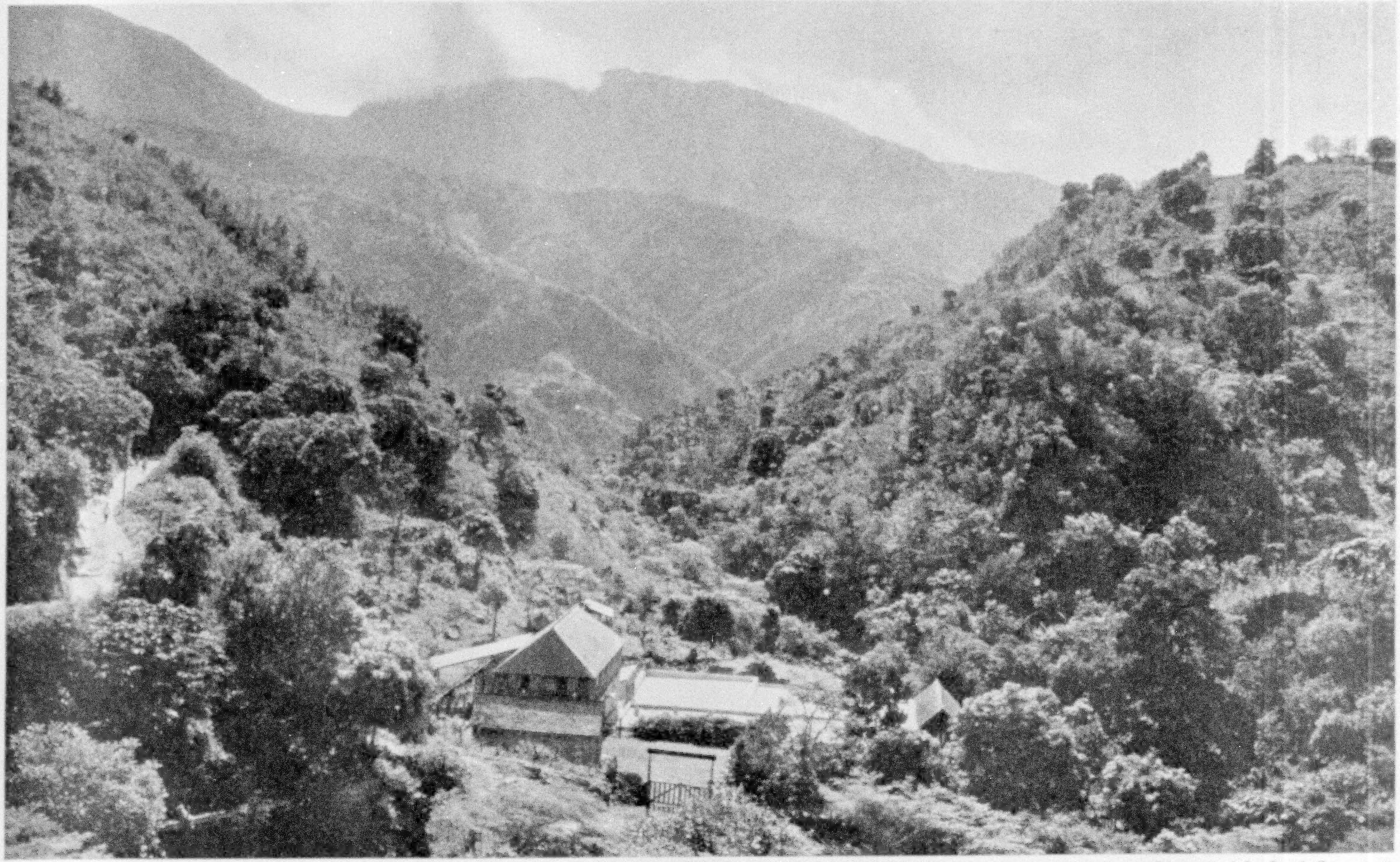
On the whole, the rural Jamaican negro is a likable individual; quite as irresponsible as a child, usually as much given to exaggeration; indifferent enough to modernity to be picturesque, respectful and retiring enough to be interesting; and one retains pleasant memories of the natives, content to be what they are, and as a class, law-abiding in major matters, however much they may indulge in petty misdemeanors.

THE GRAND CIRCLE OF EDEN

We charter a sturdy automobile at a really reasonable price and start out on our tour around the island, leaving Kingston over a road that follows the coast almost its entire length. Presently, at Harbor Head, we come to the Naval Watering Place established by Admiral Vernon, under whom served Lawrence Washington and for whom our shrine on the Potomac, Mount Vernon, was named. The old conduit is still visible. When the sailors found that it saved them from rolling heavy casks long distances in the hot sun, they said, "God bless the Admiral!" But when they found it curtailed their shore leave, the saying was shortened and less pious!

A little farther on is Albion, one of Jamaica's historic sugar estates, and beyond lie Yallahs and Morant Bay, the latter with its reminders and memories of the Rebellion of 1865, in which Gordon essayed to be the John Brown of Jamaica. He suffered the fate of Brown, but lost to the blacks all but the theoretical participation in the affairs of the island.

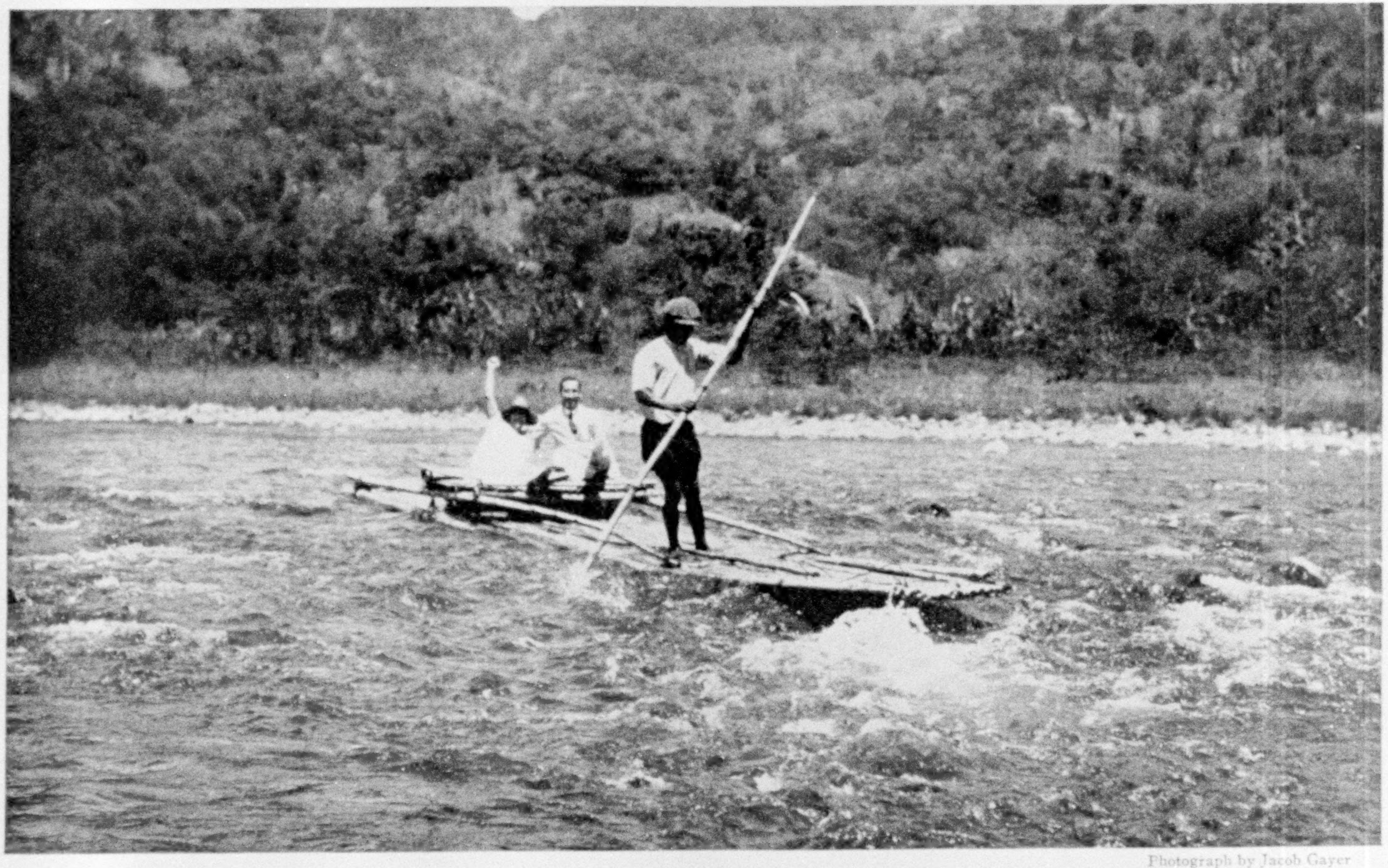
Swinging along a road over which you can comfortably make 25 miles an hour isn't a hardship, by any means, especially when the roadway passes through a beautiful country dotted with quaint villages and Old World scenes.



Photograph by Jacob Gayer

WHERE MOUNTAINS AND SKY MEET

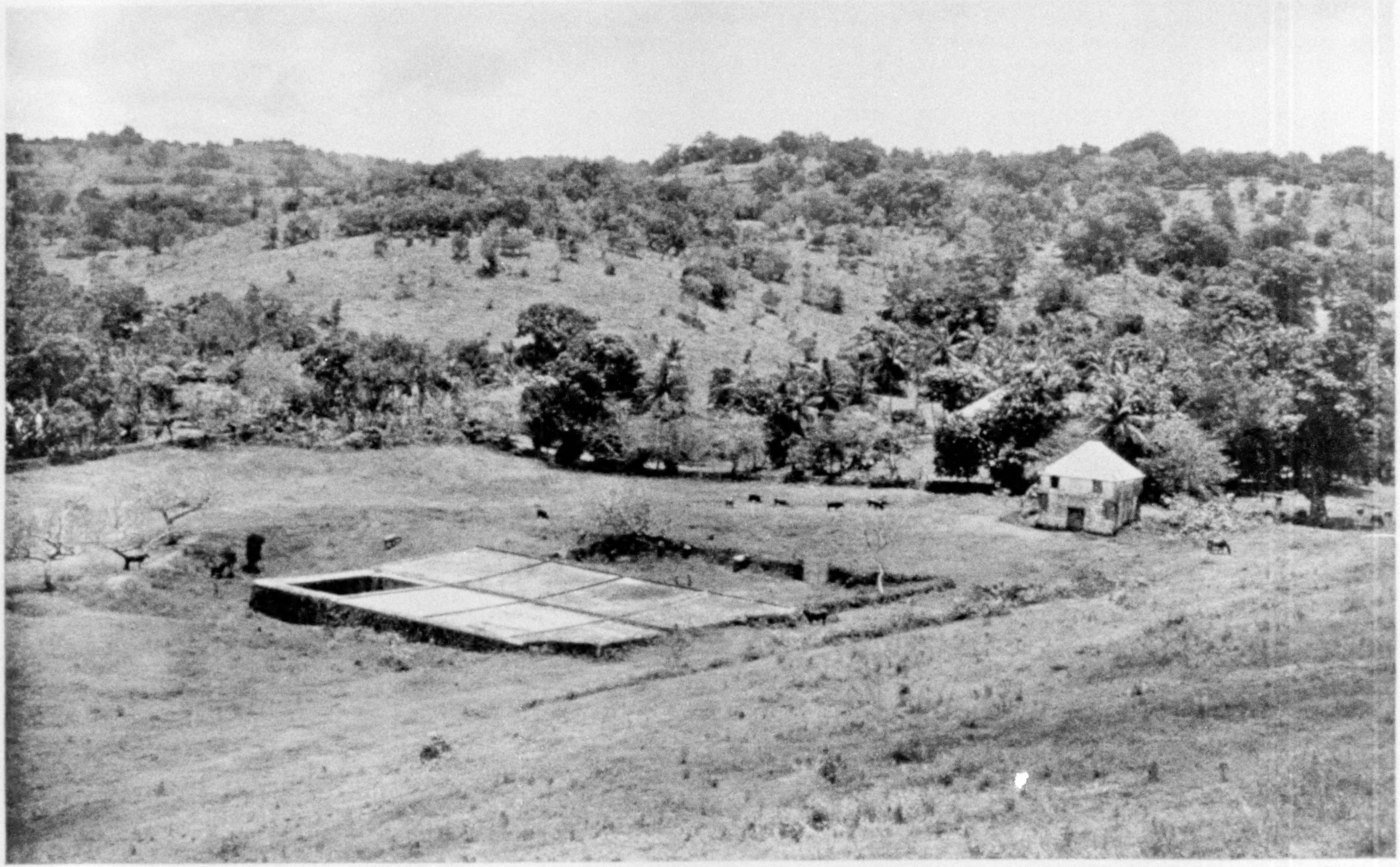
The elevation of Blue Mountain Peak, shown in the distance, is 7,388 feet above sea level. The group of buildings in the foreground is a coffee "factory," the white platforms being "barbecues" for the drying of coffee grown in this region.



Photograph by Jacob Gayer

RAFTING ON THE RÍO GRANDE

Flowing from the northern slopes of the Blue Mountains, the Río Grande, one of the finest of Jamaican rivers, passes through a most picturesque section of the parish of Portland. The passage by raft for a long section is much enjoyed by visitors and is entirely safe with a native waterman. The raft is made of bamboo and is abandoned at the foot of the rapids, as it is easier to construct a new one than to tow the old raft up through the swift water.



Photograph by Jacob Gayer

NEAR MONEAGUE, IN THE HIGHLAND COUNTRY

This part of the island is largely dependent on rain water during part of each year, and the platformlike construction in the foreground serves the double purpose of a "barbecue" for the drying of pimento and as a "catchment" for collecting rain water.

About 40 miles from Kingston, in the parish of St. Thomas, is the little town of Bath, and near by certain mineral hot springs that are justly famous for their curative properties and made this beautiful spot a gathering place for Jamaican aristocracy as far back as two hundred years.

THE STRUGGLE OF PORT ANTONIO

Beyond, on the eastern extremity of the island, is Manchioneal, the scene of some of the exploits of Scott's "Tom Cringle." And then, as we motor along the foot of the John Crow Mountains, past the Blue Hole, which so well deserves its name, eye-filling vistas of unrivaled beauty in great bays and mountain side are unfolded, and in a very few hours, that all too quickly pass, Port Antonio looms into view, with its splendid twin harbors, the westernmost of which is the best in the island (see illustration, page 32).

In 1721 strenuous efforts were made by the Jamaican Government to establish a settlement there. Thirty acres for every white person were offered and five acres for every slave imported, provided some part of each tract should be cultivated. This failing to bring enough immigrants, in 1723 two barrels of beef and one barrel of flour were added as a bonus. Later four barrels of beef and 400 pounds of biscuit, or bread, were offered to each white newcomer, and one barrel of herrings and 400 pounds of bread for each slave.

We linger a day or more at Port Antonio to enjoy the glorious scenery and creature comforts with the winter tourists who flock to the charming Titchfield Hotel, twin of the Myrtlebank at Kingston, both operated by the United Fruit Company; then head westward along the coast to Annotto Bay. Certainly that popular song of a season or two ago must have been born here, for on this road we pass through some of the finest banana plantations in the world. With the advantage of being two days closer to American markets than most of the best banana lands of other tropical communities, with labor so cheap and plentiful that much of it is exported to Guatemala, Nicaragua, Costa Rica, and Colombia in competition with the native labor of those districts, Jamaica possesses the added advantage of having a good, fat soil that is famed for producing big bunches of early bananas which beat their rivals to the market during the peak of the buying season and command high prices. The greater part of the banana plantation area of the island is owned or controlled by two large American companies.

It has also been found that cacao trees may be grown in the same fields with bananas, and that the grower can have the two crops at little more than the cost of one.

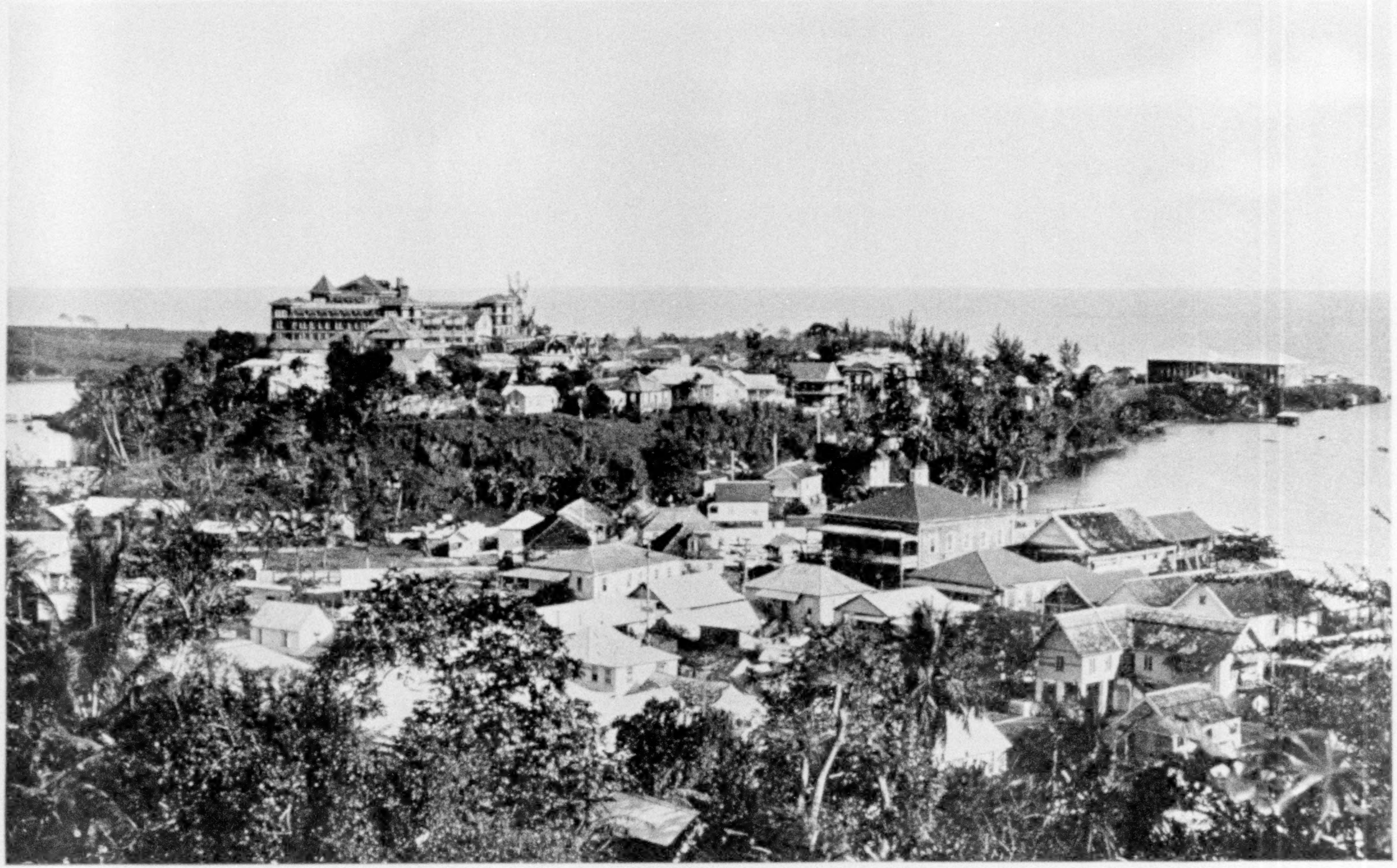
We ride along past Annotto Bay and Port Maria, the center of the north-side banana industry, and where an additional annual treasure is gained by a bumper coconut crop, which is, perhaps, reflected in the well-being of both the homes and dress of the native workers; and just ahead lies St. Anns Bay, where "Still there walks the ghost of one that ate his heart in exile here—Don Cristoforo Colón, four hundred years ago."

THE ANCHORAGE OF THE GREAT ADMIRAL

As we stand on the shore at St. Anns Bay and look out across the Caribbean, we fancy we see approaching again two weather-beaten, worm-eaten caravels, the *Capitana* and the *Santiago de Palos*. They fly the flag of the Great Discoverer.

In June, 1503, he had bidden his last farewell to the mainland of the New World he had added to civilization, and had hoisted his sails for Spain. Passing the Cayman Islands, which he named Las Tortugas, 180 miles off Jamaica, Columbus encountered a great storm. He was forced to run before it. Hoping to find shelter at Jamaica, he finally reached what is now called Dry Harbor. He found no fresh water here, so went on to St. Anns Bay, which he called Puerto Santa Gloria, and there ran his ships on the beach in one of its coves.

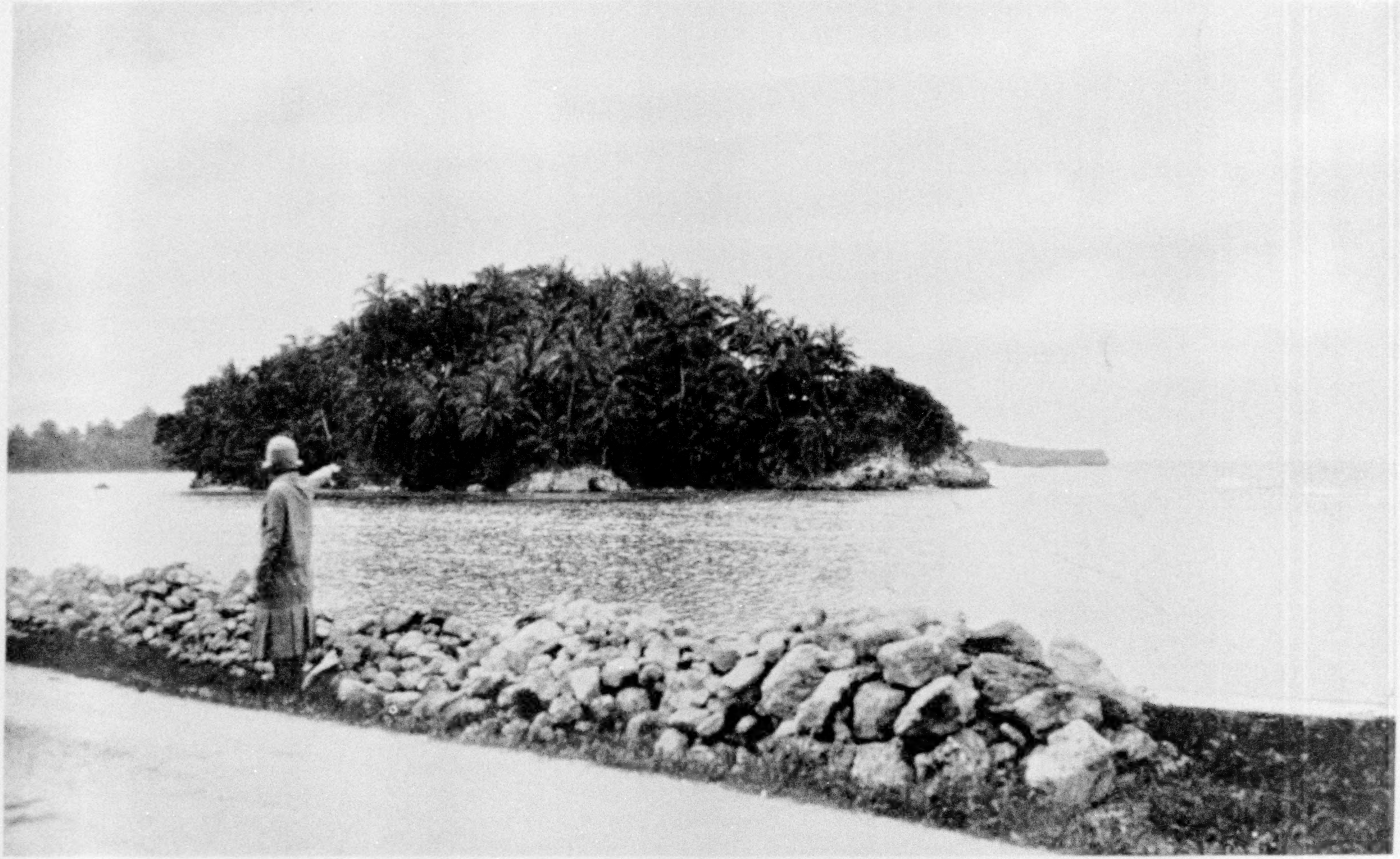
No longer seaworthy, the two little craft were propped up at high tide. The water began to fill up their holds as soon as the pumping ceased, and the gallant Admiral was forced to build cabins, thatched with straw, on deck to take the place of those that were no longer habitable below. Strange-looking craft they must have been.



Photograph by A. Duperly and Son

THE NORTHERN OF JAMAICA'S TWIN PORTS

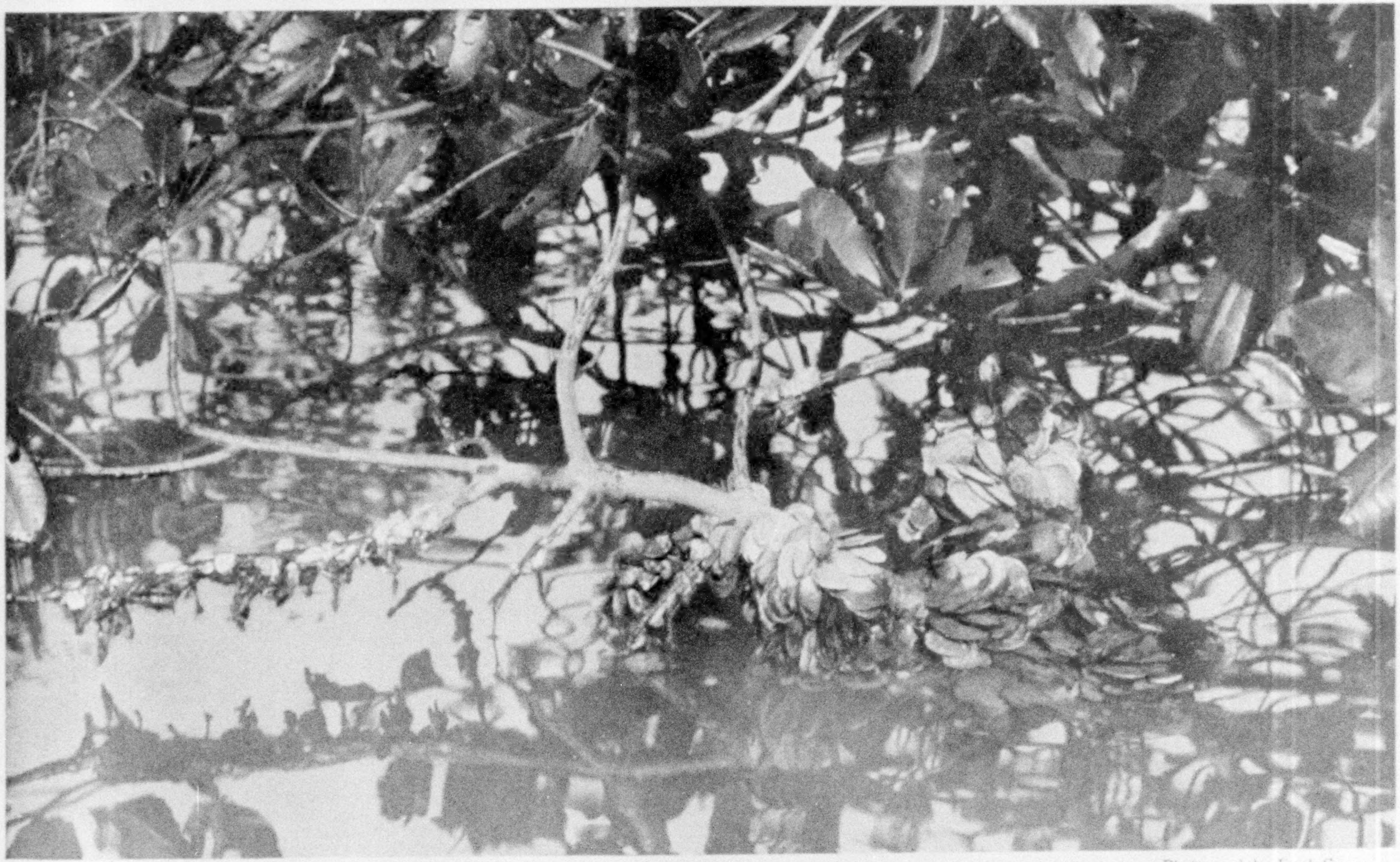
Port Antonio vies with Kingston, on the other side of the island, as a tourist center, and the comfortable and restful hotel on the heights in the left background is crowded during the winter season (see, also, text, page 31).



Photograph by John Oliver La Gorce

AN ISLE OF DREAMS

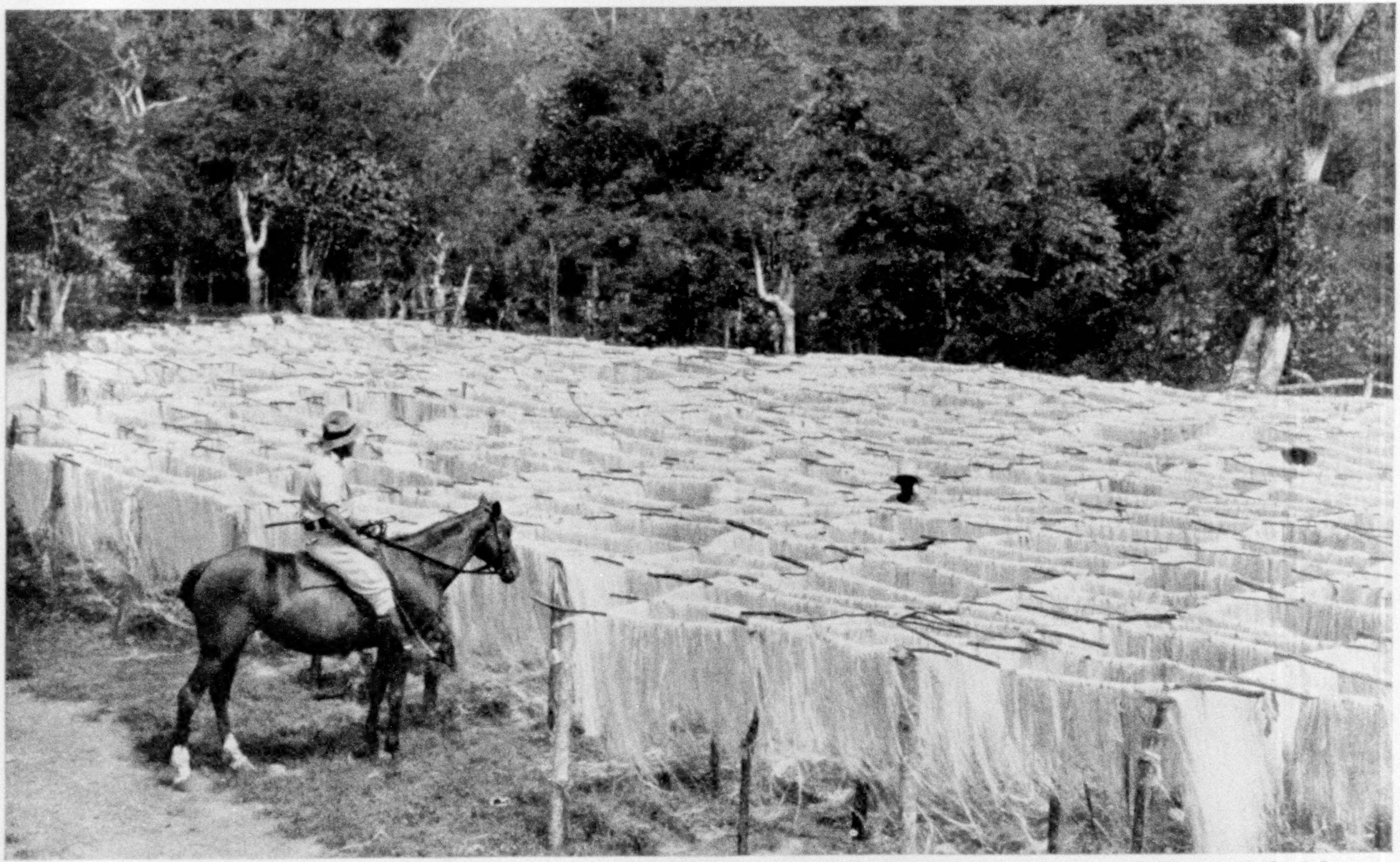
Between the famous Blue Hole (see Color Plate V) and Port Antonio, this charming little island, covered with towering palms, deserves, and receives, the open-eyed admiration of the traveler.



Photograph by Jacob Gayer

OYSTERS GROW ON TREES—IN MONTEGO BAY

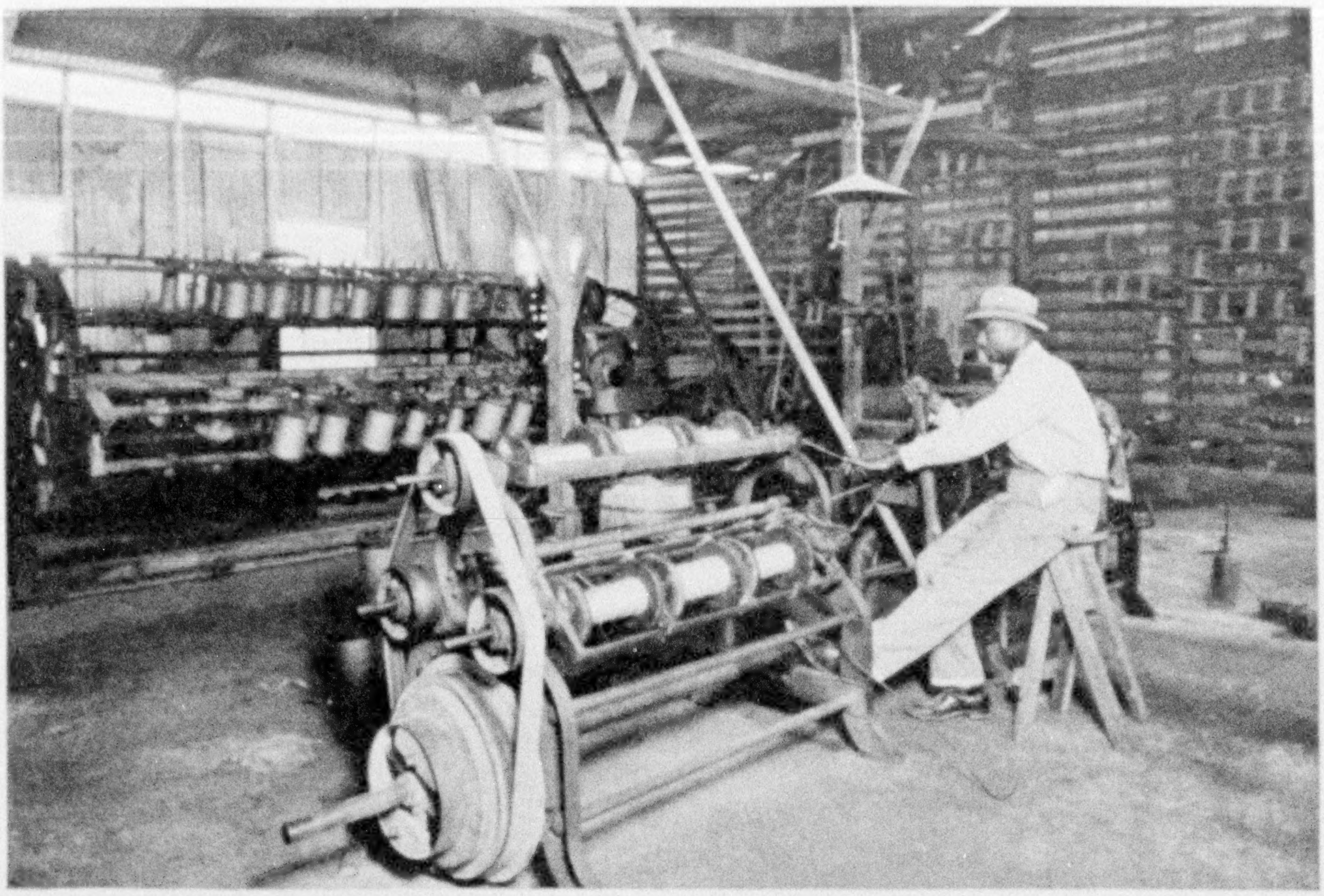
Many a traveler's tale has been based on less real fact than the one that "oysters grow on trees in Jamaica." These oysters (*Ostrea parasitica*) attach themselves to the roots of mangrove trees and, being exposed to view at low tide, give the appearance of having grown on the trees like fruit. This intertidal species of oyster is not peculiar to Jamaica, however, for it thrives in some of our own southern rivers.



Photograph by Jacob Gayer

DRYING SISAL FIBER

After this open-air curing, the fiber is baled and exported, or is used in the manufacture of rope and twine in rope factories on the island.



Photograph by Jacob Gayer

A ROPE FACTORY AT MAY PEN

Sisal, from which the rope is made, is grown in the immediate vicinity. It flourishes in these warm climates with little care (see, also, illustration, page 35).

Making sure that his men would do nothing to violate the confidence of the Indians, Columbus soon established trade with them, and they brought him cassava, fish, and birds. His youthful son, Fernando, took great interest in the barterings, the records tell.

Finally the food aboard and that supplemented by the near-by Indians gave out, and after the last ration of biscuit and wine had been issued the Admiral's faithful follower, Diego Méndez, started out through the jungle on a trading expedition which netted a scant fare, but enough to keep away starvation, even if not sufficient to appease hunger.

Columbus then called for volunteers to try for Haiti, some 200 miles away, in search of succor. All were silent but the gallant Méndez. He stepped into a small ship's boat and rowed away!

Then sickness and body ills brought despair and mutiny. The brothers Porras (Francisco, captain of the *Santiago*, and Diego, the accountant) led a revolt in which Juan Sánchez, the pilot Ledesma, Barba the gunner, and some fifty others joined.

Though so ill with gout that he could not stand, Columbus endeavored to go out and quell the mutiny, his log tells us. But his adherents begged that the mutineers be permitted to go.

They took most of the scanty stores, the ten canoes and started for Haiti; but, cowards that they were, they gave up the trip after forcing the Indians who accompanied them to swim ashore.

HIS CUP OVERFLOWS

A caravel heaves into sight! Is it the long-looked-for relief sent by Méndez? Alas, no! Only a sorry jest by Ovanda, who sent out Escobar in the hope he would find Columbus dead, and, if not, to tell him there were no ships available to carry them to Spain.

Hearing that Porras and his mutineers were going about making enemies of the natives, Columbus sent the *adelantado*, Bartolomé, either to pacify or to conquer the deserters. Bartolomé took fifty loyal men and going against them captured the mutineers. Yet Columbus, with his usual clemency, granted pardon to all except the brothers Porras, whom he kept in chains.

Photograph by Publishers' Photo Service

TOURING IN JAMAICA

The road system of the island is being constantly improved, and innumerable men, women, and children are seen along the way breaking rock under government contract for road repair. They seem happy and contented in this work, which to the American negro would, perhaps, seem a great hardship.

Finally, a full year after he had landed there, the eyes of the Admiral saw another sight—two caravels, one sent by the faithful Méndez, and the other by Ovando, who had repented his previous sorry attitude.

So it was, on June 28, 1504, after twelve months and four days of a wretched, stranded existence at Jamaica, Christopher Columbus sailed home again, never more to look upon the world he had discovered.

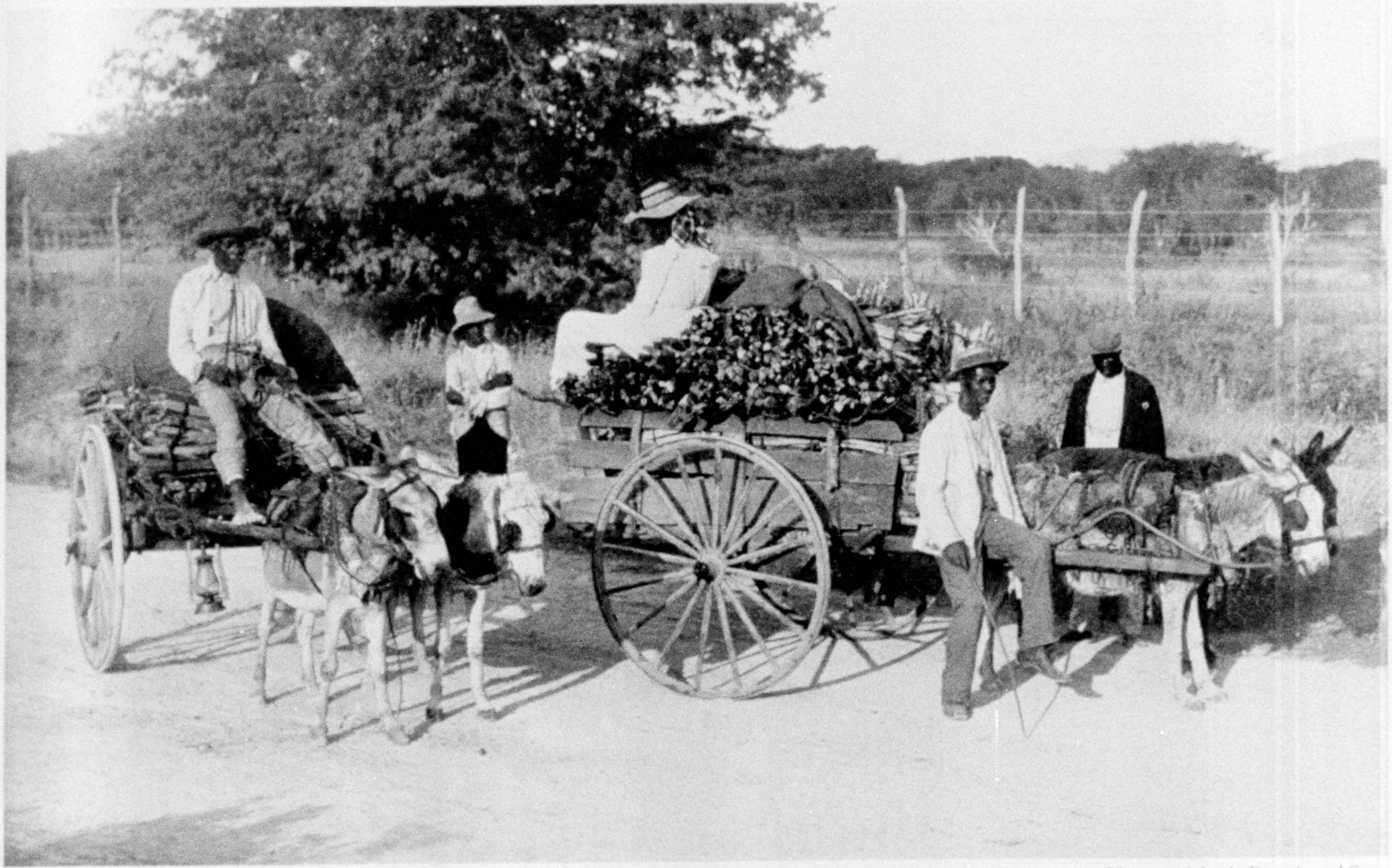
PICKING UP THE JOURNEY

Leaving St. Anns Bay, we come to Runaway Bay, appropriately named as the place where Sasi, the last redoubtable Spaniard to oppose the British, fled. He escaped in a canoe "and ended his days in the bosom of peace and Christianity, by retiring to a monastery in Spain."

Continuing westward, and enjoying to the utmost the wonderful and ever-changing sequence of great bays that seem duplicates of that of Naples, we finally pass Rose Hall, ideally located on a great hill overlooking the sea and surrounded by one of the largest and, a century ago, one of the richest sugar estates in Jamaica. The Hall, which has a most interesting history all its own, was once considered the finest home in the island, but it is now crumbling into decay; yet the floors and trim of the great drawing room and grand stairway of solid mahogany remain as silent testimony to its colonial grandeur. The natives will tell you that one of its infamous mistresses, Ann Palmer, "killed three husbands, and the fourth killed she," whatever that may mean.

In this region one passes through many "Maroon towns." The term "Maroon," said to be a corruption of the Spanish word "Cimarrón," meaning wild and untamed, was applied to those negroes, originally fugitive slaves, who, being unable to stand the oppression of their cruel masters, fled to the trackless mountains of the island, dealing death and destruction as they went.

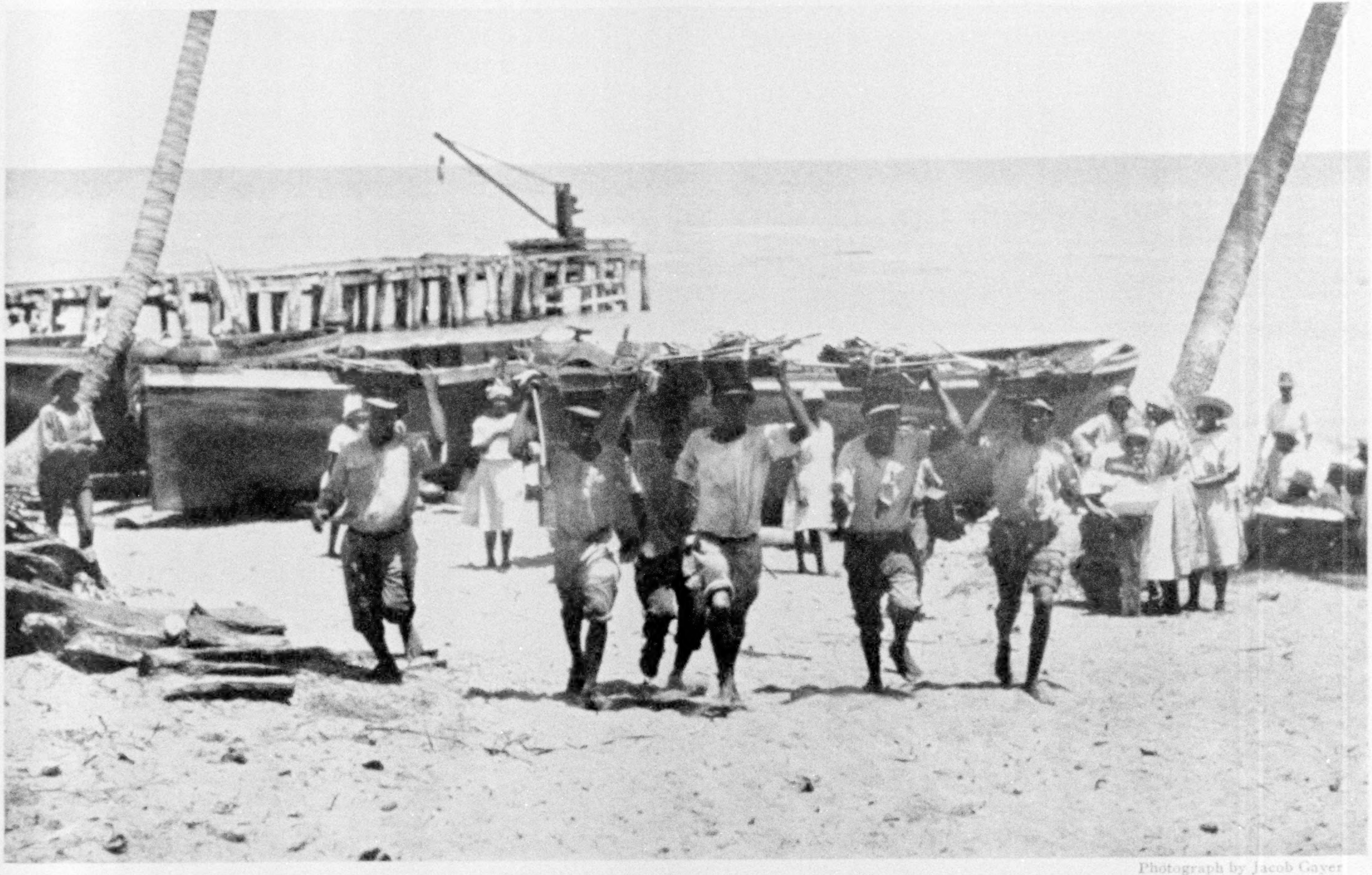
Despairing of fighting the fugitives in their mountain strongholds, the whites



Photograph by A. Duperly and Son

MARKET BOUND

With the patient burro and a tiny cart, the problem of transportation is solved in Jamaica.



Photograph by Jacob Gayer

THE BLACK MARATHON STARTS FROM ALLIGATOR POND

To run 18 miles, from sea to mountain top, carrying a dead weight on one's head, is hardly conducive to the allotted "three score and ten" (see text, page 41).

Photograph by Jacob Gayer

A TEST OF SPEED AND ENDURANCE IN THE TROPICS

Jamaica's native runners, bringing baskets of fresh fish from sea level to the Mandeville market, 18 miles away, uphill nearly all the way (see, also, text, page 41, and illustration, page 39).

finally made peace with the Cimarrons, and reservations were set aside for them in the area now called Trelawny and the Cockpit country. Later the blacks again rebelled, and this time 40 chaussers and a hundred bloodhounds were imported from Cuba. The news of the coming of the bloodhounds weakened their courage and the runaways promptly surrendered. Most of them were deported, first to Nova Scotia and then to Granville Town, in Sierra Leone. As was ever the case in the early days of the New World, the Spanish occupation spelled extreme cruelty and hardship for the slaves, and Jamaica was no exception.

We come to rest for a day, and would like to spend a month, at an altogether charming resort, Montego Bay. Here the sparkling waters of the Caribbean are at their best, and to go into the sea feels like bathing in liquid velvet.

The varied fish life of the warm sea is close at hand in this holiday spot, where oysters grow on trees (see illustration, page 34), and at night, from the windows of the small, but very charming, Casa Blanca Hotel, one can see far below, in the depths of the quiet waters, the little fishes that are equipped with their own lights, thus to beguile their minute prey. There is another very comfortable hotel, the Ethel Hart, at Montego Bay, and to this spot come annually, to spend the winter months in the lap of summer, many visitors from England and Scotland, as well as the United States. I venture to say that many more would come and tarry for the season if accommodations were available and the fact made known to the tourist world.

EAST INDIAN STRAIN HAS SAFEGUARDED JAMAICAN CATTLE

At Montego Bay we leave the coast road and cut across the western end of the island to Savanna-la-Mar, passing en route the great cattle ranch at Shettlewood. It is an interesting fact that many of the famous breeds of beef cattle originated in Great Britain, as well as most of the leading milch breeds. But these, in their pure strains, are not suited to tick and lice-ridden tropical lands. The Zebu, or Indian breeds (see page 13), provide a crossing that makes a practically disease-immune stock. An infusion of from 10 to 20 per cent of Zebu blood leaves unspoiled in the British original breeds all the shape, quality, and size of British cattle, and yet produces the pigmented skin and short hair that fit them for tropical existence. The introduction of Zebu sires into Jamaica has also resulted in revolutionizing the working cattle of the island, giving them strength of limb speed of action, and weight they never before possessed.

From Savanna-la-Mar we leave a somewhat uninteresting coastal region and go inland through the logwood plantations (see page 23). Logwood not only is used in dyestuff production, but the flowers of the trees make the finest bee pastures imaginable. Logwood honey, properly gathered and marketed, stands at the head of the world's famous honeys on the London market. It has a delectable taste that simply defies competition.

Photograph by Jacob Gayer

A SILENT SYMBOL OF BYGONE DAYS (SEE PAGE 18)

The old bronze church bell, dating from the sixteenth century, is one of the few remaining relics of the Spanish occupation which ended in 1655. It is safeguarded in the Institute of Jamaica at Kingston.

THE END OF THE BLACK MARATHON

There is a real charm in motoring on through the mountains, for at every hilltop a new scene of beauty unfolds, which has its climax as the ascent of Spur Tree Hill is made, and from its top a glorious panorama of a hundred square miles fills the eye.

Passing over the summit of Spur Tree, we drop down to the flourishing little townlet of Mandeville, that nestles 2,200 feet above the wave-lapped strand. From Mandeville, the county seat of the parish of Manchester, it is nearly 18 miles to the sea, and the nearest source of fresh fish from the Caribbean larder is called Alligator Pond.

Between these two points of supply and demand, 18 miles apart, is the daily scene of a Black Marathon that also has the tinge of heartbreak for the participants. Every morning at sunrise a group of native runners, each carrying from 20 to 30 pounds of freshly caught sea fish in baskets upon their heads, starts on the long run for the Mandeville market. Climbing a winding roadway up the slopes from sea level to mountain top is a feat that would tax most of our college Mercurys to their utmost in endurance (see page 40).

Along the route the ebon runners pant, dogtrot succeeding sprint; then a few moments' rest, and they speed on again. The Mandeville housewives never can be sure of how many bearers start from the seaside; therefore the first to arrive get the best price for their fish, and the prize of a few shillings more awaits the fleetest. These runners do not last many years at this pace, for Nature frowns upon the overdraft on heart and lungs and the end is inevitable. One little old Ford would do the work of a dozen human engines panting up the mountain side; but—well, runners are numerous and much cheaper than gasoline in this part of the world.

From Mandeville, where the Harvard University Observatory specializing in the study of the moon and planets is located, there is a captivating road that swings down to the coast again, carrying one along the beautiful Milk River; it returns north around Old Harbor Bay, where Columbus touched on his second voyage, and then winds into Spanish Town.

THE COLONIAL CAPITAL OF THE ISLE, ONCE A PLACE OF SPLENDOR

A delightful place is this capital of aboriginal, Spanish, and early English rule in Jamaica. There is nothing left to remind us of the mild "meal-eating" Arawaks who contrasted so favorably with the "man-eating" Caribs that gave their name to the sea they dominated. The only place left for the savages is on the coat of arms of the colony.

Under the Spaniards this settlement of Spanish Town was called Sant' Iago de la Vega, and is supposed to have been laid out about 1534. In 1536 the island of Jamaica was ceded to Louis Columbus (son and successor to Diego Columbus), who, in addition to his title of Duke of Veragua, became the Marquis de la Vega. It had taken the place of Sevilla d'Oro, or Golden Seville, on the north shore, as the Spanish capital, and continued to be the Jamaican capital until 1872, when Kingston succeeded to that honor.

An English merchant, describing life in Spanish Town two centuries ago, declared that "one gets no more credit for keeping a coach and six there than for keeping a horse in England, it is so common," and descriptions of the life of the rich planters, even as late as 1850, are filled with stories of coaches and fours, outriders and high-booted postilions running the highways between plantation visits.

The glory of being the capital is gone, but in Spanish Town there is a mellow charm around the old Square, environed as it is by the King's House, the Rodney Memorial, the Court House, and the House of Assembly, that makes one wish to linger there, for romance is not far away.

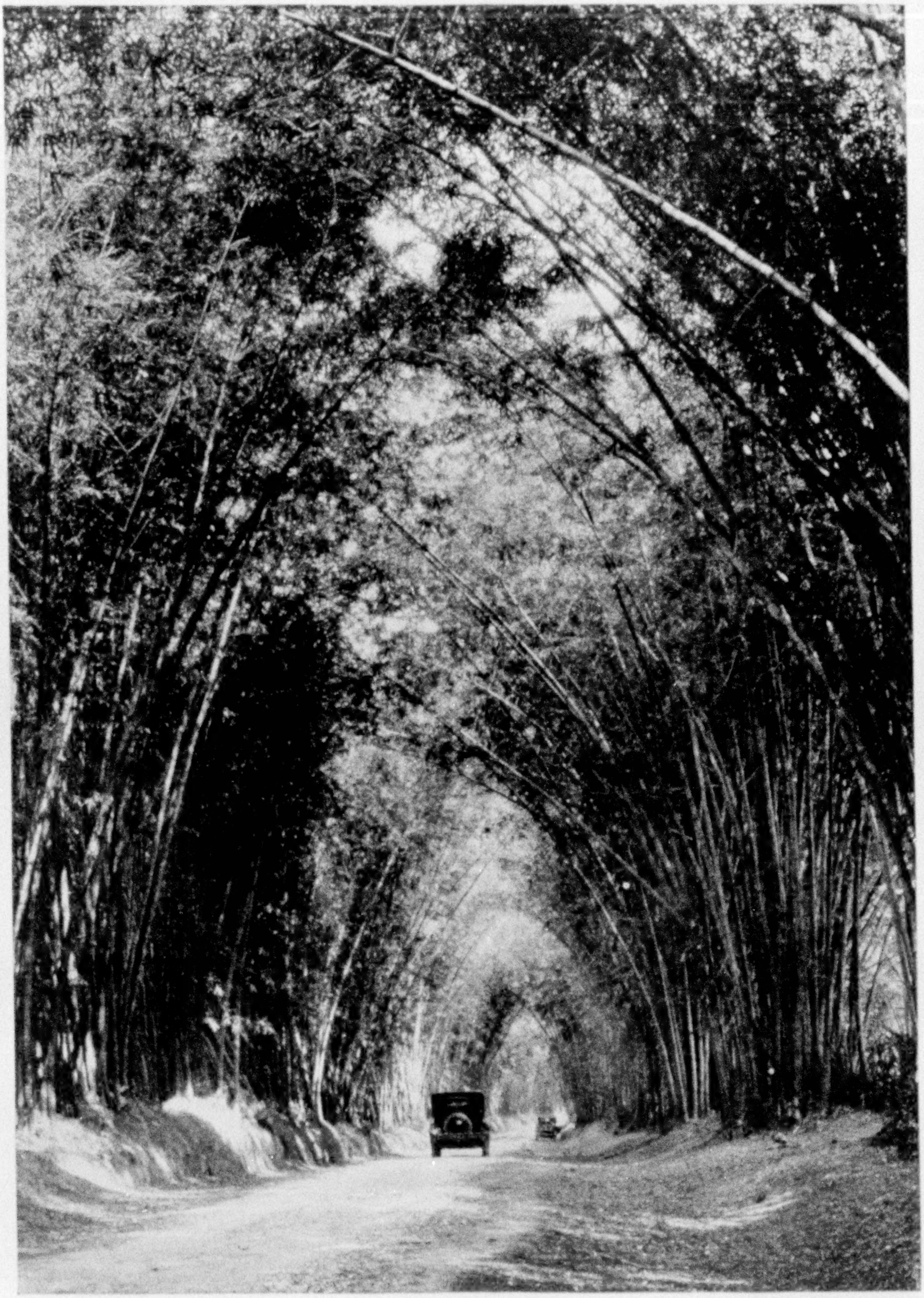
THE HISTORIC CATHEDRAL

No visitor to Spanish Town who reacts to the call of olden days can forget the impressions that quietly surround him within the restful inclosure of the old parish church founded in 1655—restored, of course, yet the oldest cathedral in the British colonies. Beneath the gravestones that form its floors and inscribed on the silent monuments that guard the walls are such names as Catherine, wife of Sir Charles Lyttelton, 1662; Governor Sir Thomas Modyford, 1679; the Earl and Countess of Effingham, 1791; the wife of Sir Adam Williamson, 1794—these last several being beautifully carved tributes from the master hand of the English sculptor, Bacon. Over there is a simple stone, dated 1682, that marks the last resting place of the gallant Colonel Colbeck, who fought the Spanish for their golden isle side by side with Admiral Penn and General Venables; yonder the sleeping place of the Countess of Elgin, and near by that of Samuel Long, who outgeneraled the Earl of Carlisle in safeguarding the privileges of the island for the planters.

To glance through the old registers of baptismal and marriage entries fills the eye with names that brighten the page of English history. The courteous sexton will show you all of his treasures if you will but request it, and his pride in their guardianship is something of a lesson in restraint.

OTHER VISITS TO DELIGHT THE MIND

All good things must come to an end, it is said; so we leave quaint old Spanish



Photograph by Jacob Gayer

AN AVENUE OF BAMBOO NEAR LACOVIA

Bamboo is not indigenous to Jamaica, but was introduced for its supposed economic value in the manufacture of paper.

Town behind and speed on to Kingston, where our island tour began.

If not yet satisfied and no scenic indigestion falls to our lot, other places and interests are calling. The side trips are many.

There is the Rio Cobre, with its luxuriant and beautiful vegetation—ferns, rushes, creeping black-eyed susans, bamboos, coconut palms, annattos, guangos, and many other trees of beauty and value.

Gaulin, teal, and kingfishers are so tame that they bespeak kindly human neighbors, while humming birds industriously flit from flower to flower.

Near the mouths of the many rivers one notices fine coconut plantations. There is a crop for a tropical farmer who likes repose! Given good soil and a little cultivation, it will yield some 3,500 nuts per acre in this garden spot, and the nuts don't bruise when they fall, either!

Pimentos, or allspice, is another Jamaican product. It grows on a species of myrtle which attains a height of 30 feet and a trunk diameter, at the base, of some 3 feet. The bark is smooth and shiny and the leaves a deep green. The allspice are the fruits, picked when full, but not ripe. A boy shinnies up the tree, breaks off the small branches bearing the clusters of fruit, and throws them to the ground. He thereby prunes the tree and assures its bearing the following year. The native women pick the berries from the branches and carry them to drying floors called barbecues, which are paved and exposed to the sun. They are periodically raked, so that every side of the berry gets its share of the sun. From six to ten days are required to cure the allspice for market or export.

AMONG THE ISLAND'S HIGHLANDS

The highlands of the island are indeed regions of delight. At Malvern, in the Santa Cruz Mountains, one finds, at 2,500 feet above sea level, refuge from the heat of the plains and a region where the thermometer seldom goes above eighty, even at midday.

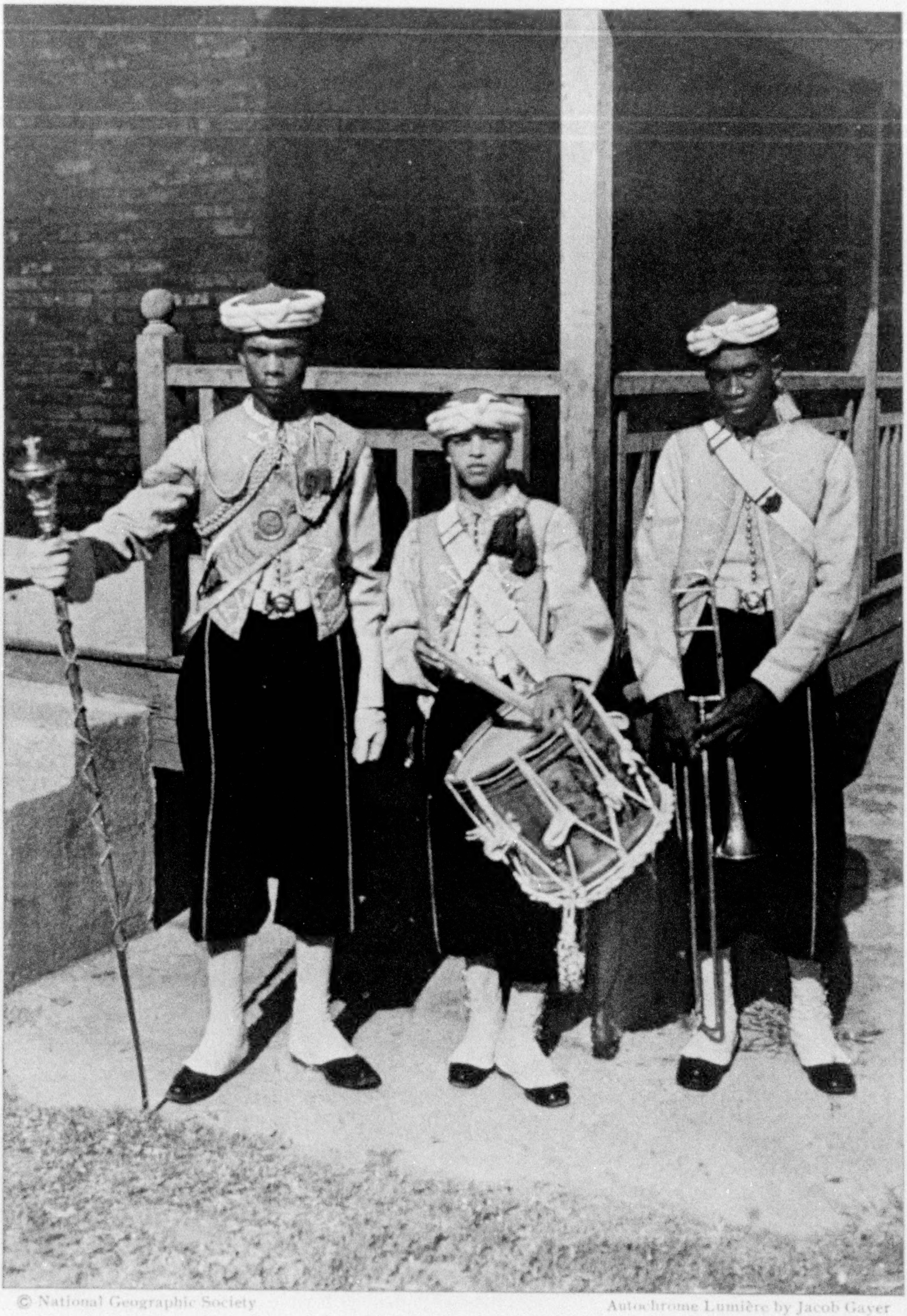
A drive across the island from Kingston to St. Anns Bay carries one through Spanish Town and along the celebrated Bog Walk, across the beautiful Mount Diabolo, atop whose summit is a good hotel, at an elevation of 2,300 feet. A fairer view could hardly greet the eye anywhere than from its broad veranda, where, on a bright day, with a glass, one may see Cuba far away to the north, and Kingston and the Panamaward reaches of the Caribbean to the south.

TO THOSE WHO LOVE NATURE

Beyond, one descends through a region of grazing pens, as the Jamaicans denominate their ranches, down past Moneague, where a very comfortable little hotel is situated and the view much like the Scotch Highlands, to Ocho Rios, with the last part of the trip through Fern Gully, a deep ravine several miles in length, the entire distance banked with as many varieties of remarkable ferns as the heart of the most blasé traveler could wish (see page 25).

Jamaica also boasts of a railroad, if you please—a government road that admits 200 miles of track. The first of its lines was operated in 1845, being then but 15 miles in length. Between the capital, Kingston, and the northwestern land's end of the island, Montego Bay, there is a daily train each way, except Sunday, while from Kingston to Port Antonio there dashes one each weekday and two on the Sabbath. The visitor who prefers railway travel to automobile will not be displeased, for the routes traverse areas of picturesque beauty and at times reach mountain heights of nearly 1,700 feet (see map, page 4).

The fascination of a tour around and across Jamaica cannot be overpictured. The ever-changing character of the scenery, the wide diversity of the types of agriculture, the charm of the legends associated with the communities en route, the richness of the historical lore of times when men who bore a more or less class relation to the evolution of our own history—all join hands in peopling every hour with healthful interest.



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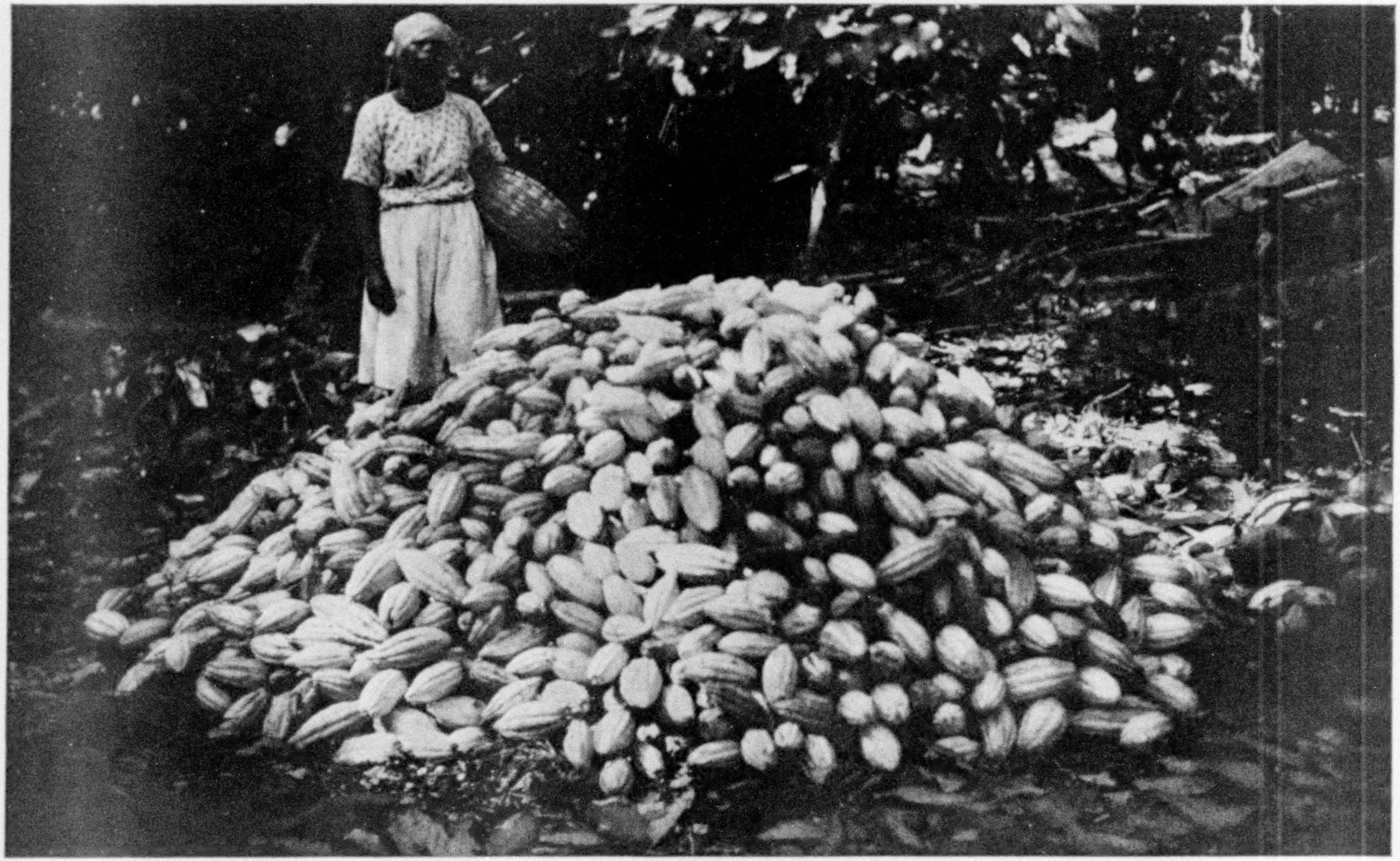
Autochrome Lumière by Jacob Gayer

READY FOR DRESS PARADE

A youthful drummer and two bandsmen of the West India Regiment. The gay Zouave costume is for full-dress occasions only, the service uniform being of khaki.



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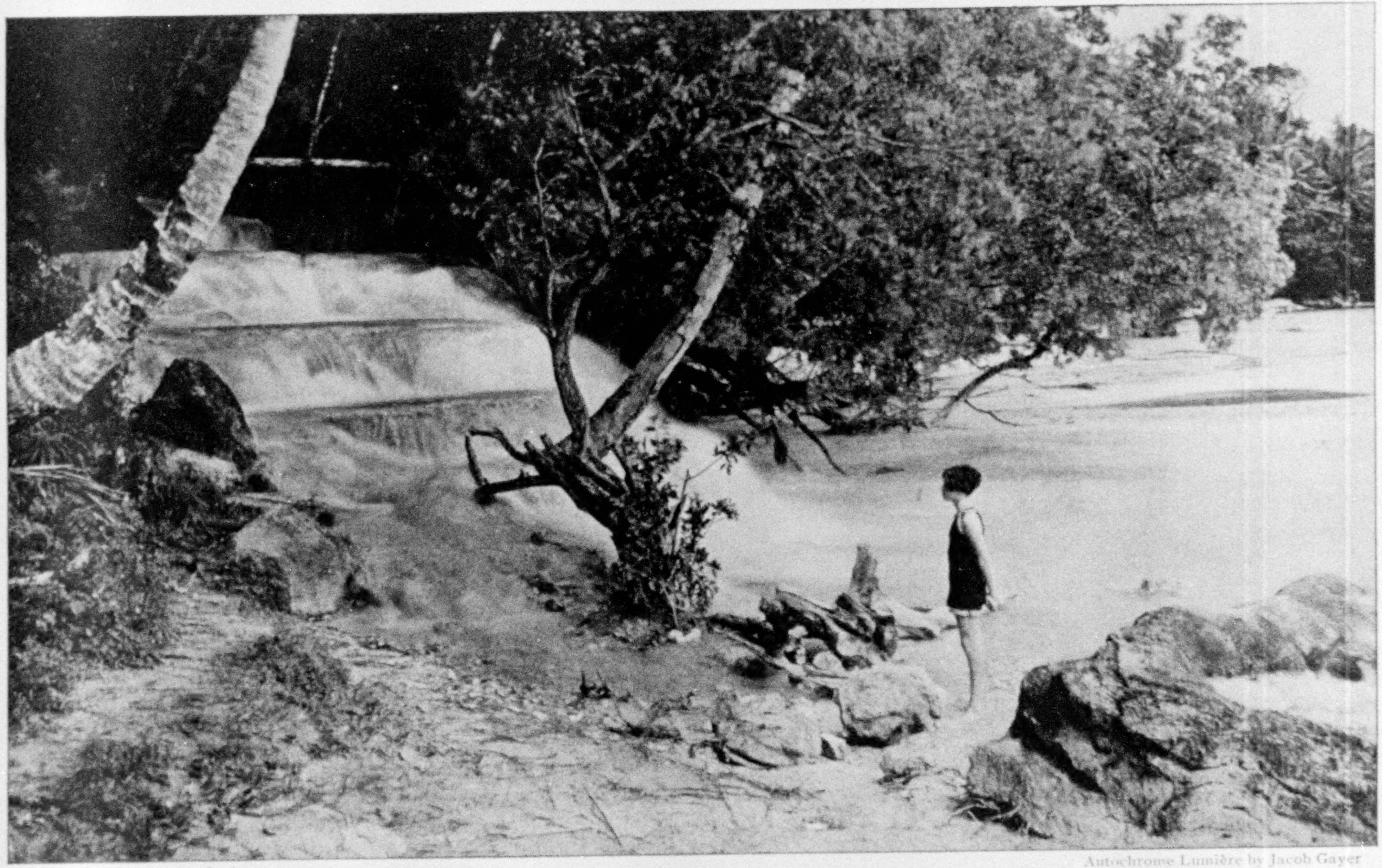
CHOCOLATE IN THE POD

Each cacao pod contains a large number of seeds about the size of a Lima bean, which, after being dried and ground, form the cacao of commerce from which chocolate and cocoa are made. This is one of the important exports of Jamaica.



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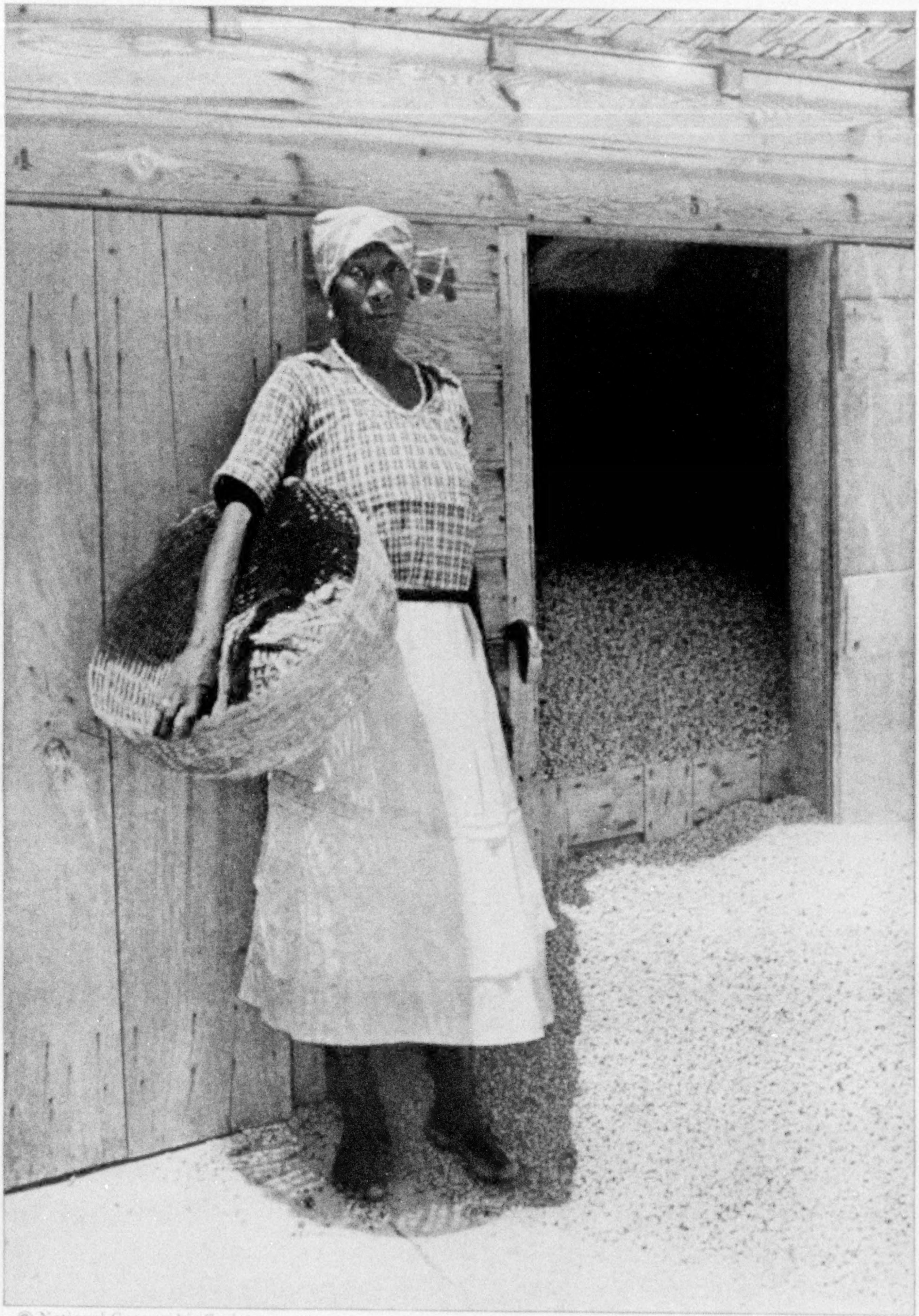
A RENDEZVOUS OF STREAM AND SEA

Dunns River tumbles into the Caribbean on the north coast of Jamaica, near St. Anns Bay. The meeting place of the fresh and salt waters is a popular resort for bathing parties.



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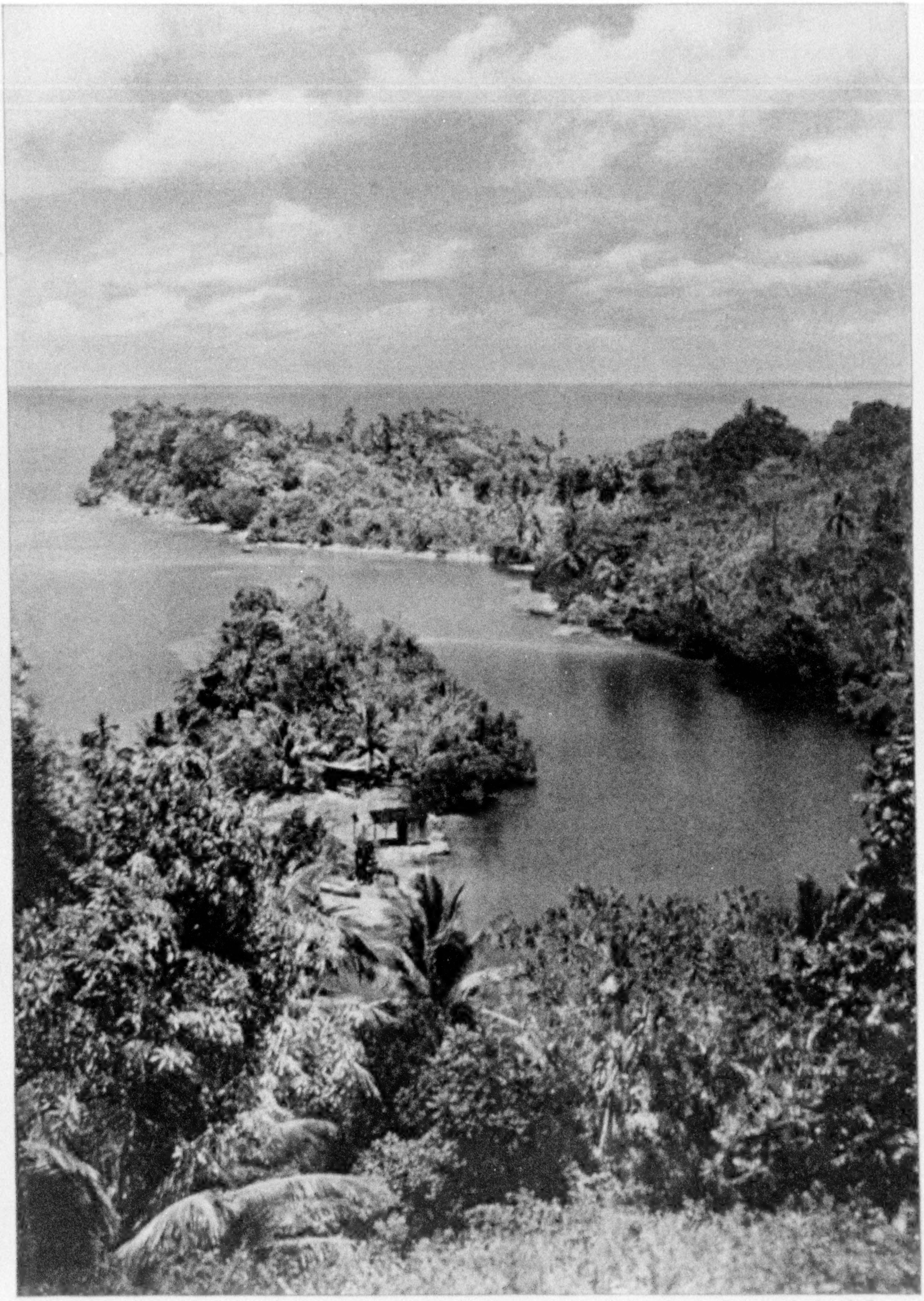
A "COFFEE FACTORY" WORKER

The berries have been separated from their husks, cleaned and dried in the sun, and are now ready to be sorted before sacking and shipping.



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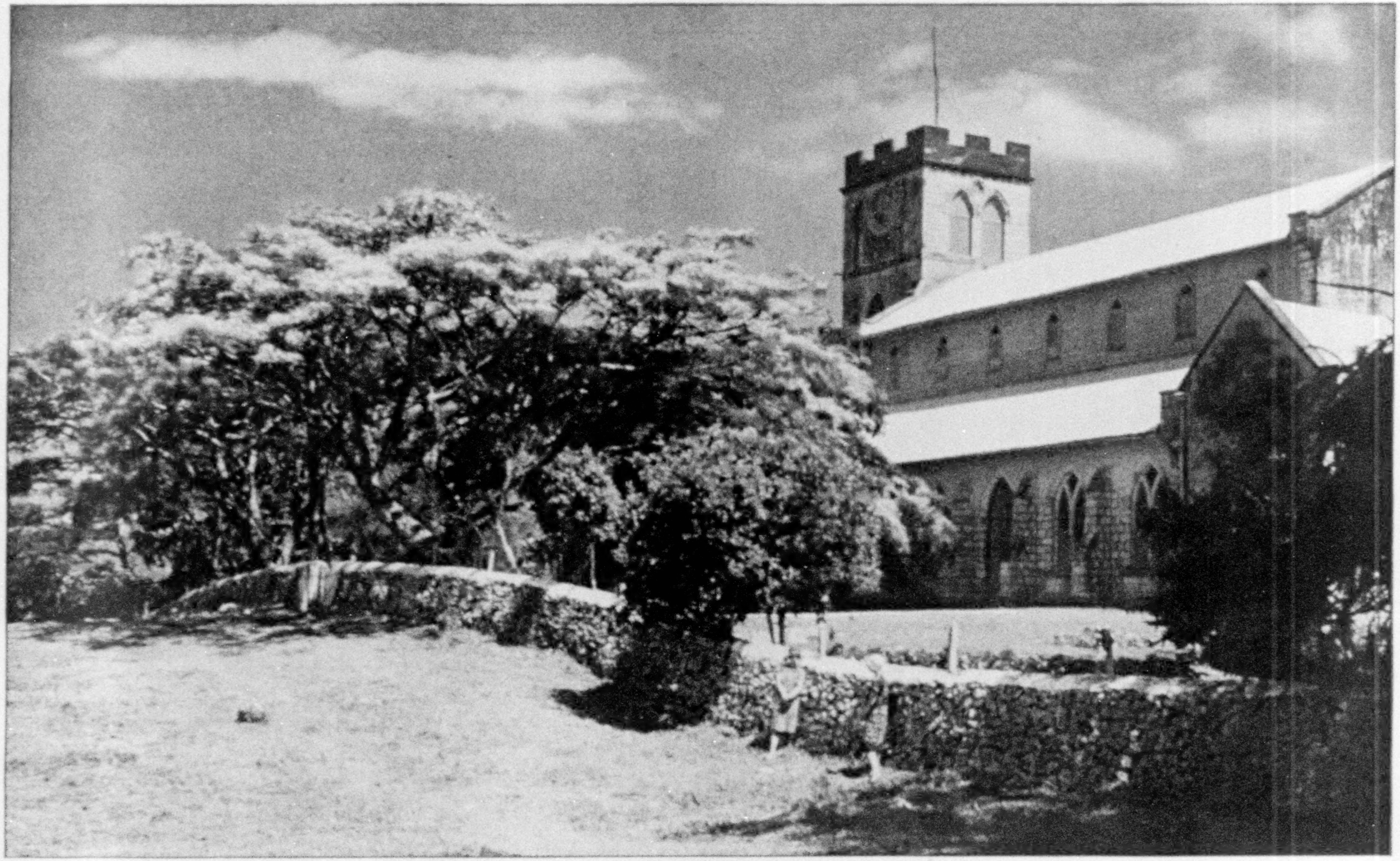
Autochrome Lumière by Jacob Gayer

WHERE THE BLUE BEGINS

The great depth of this lovely cove gives its water such an azure hue that it is known colloquially as "The Blue Hole."



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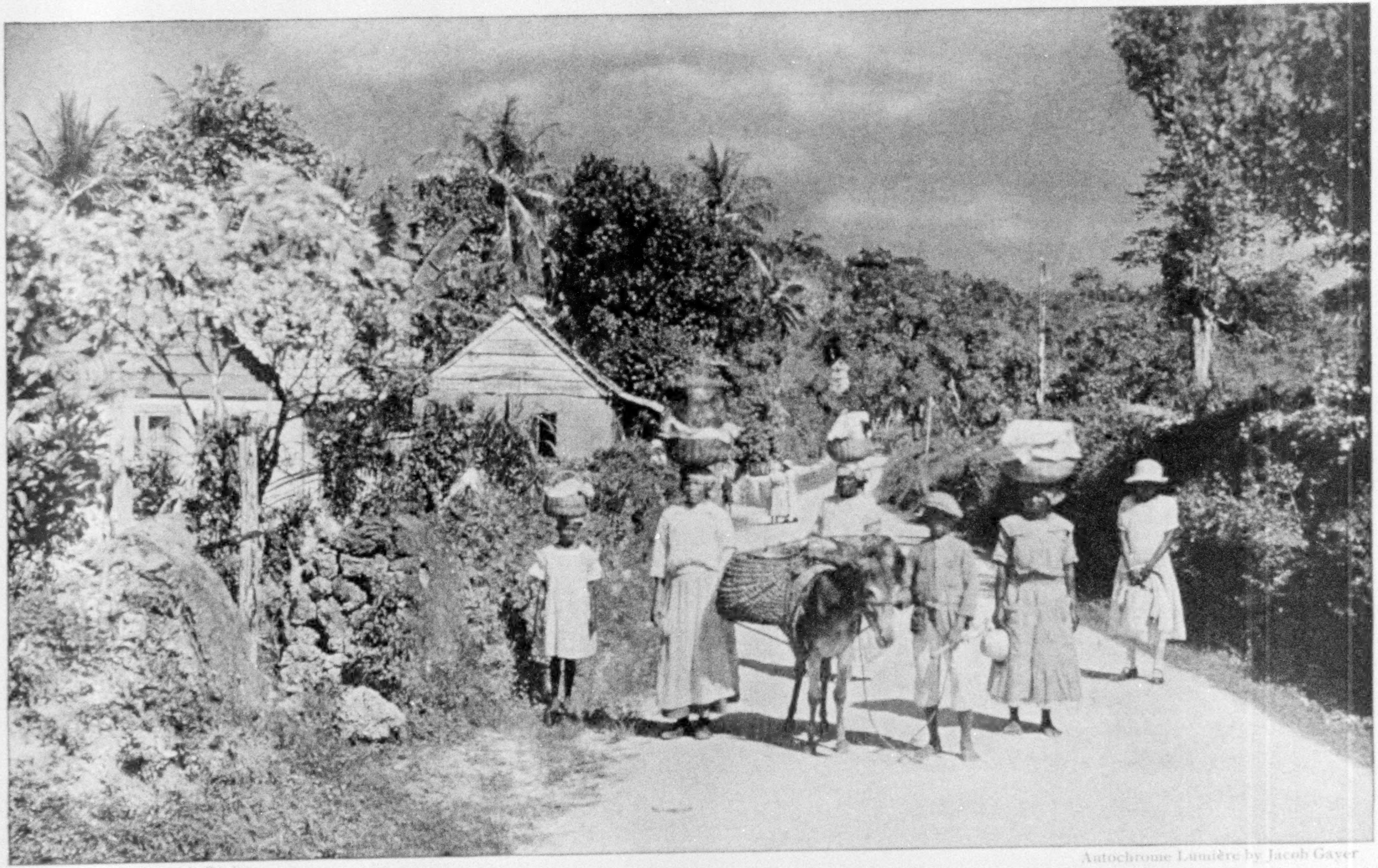
WHERE CLIMATIC ZONES MEET

In Jamaica, as in other mountainous tropical countries, a few thousand feet in elevation above sea level effect a marked change in temperature and physical aspects of the countryside. Certain parts of the island suggest scenes in rural England, but the flaming royal poinciana introduces a tropical note and reminds the traveler that he is still in the low latitudes.



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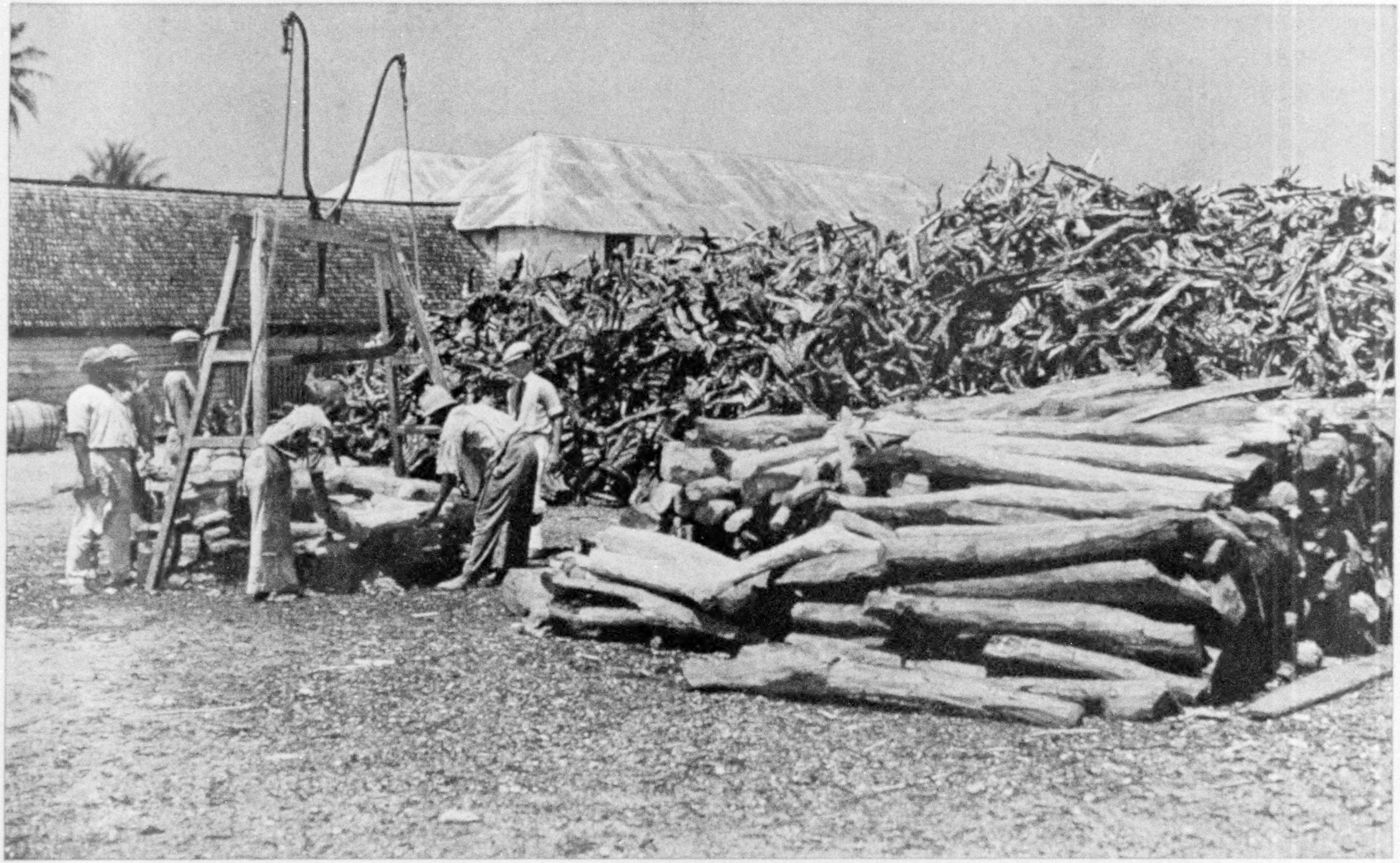
ON THE WAY TO MARKET

On Saturdays such groups are to be met all along every road in the island. The country people dress in their best for market day and everybody is happy except the donkey, whose pessimistic attitude may be due to the fact that he knows when his load of produce is disposed of he will have an equal or greater human cargo on the homeward trip.



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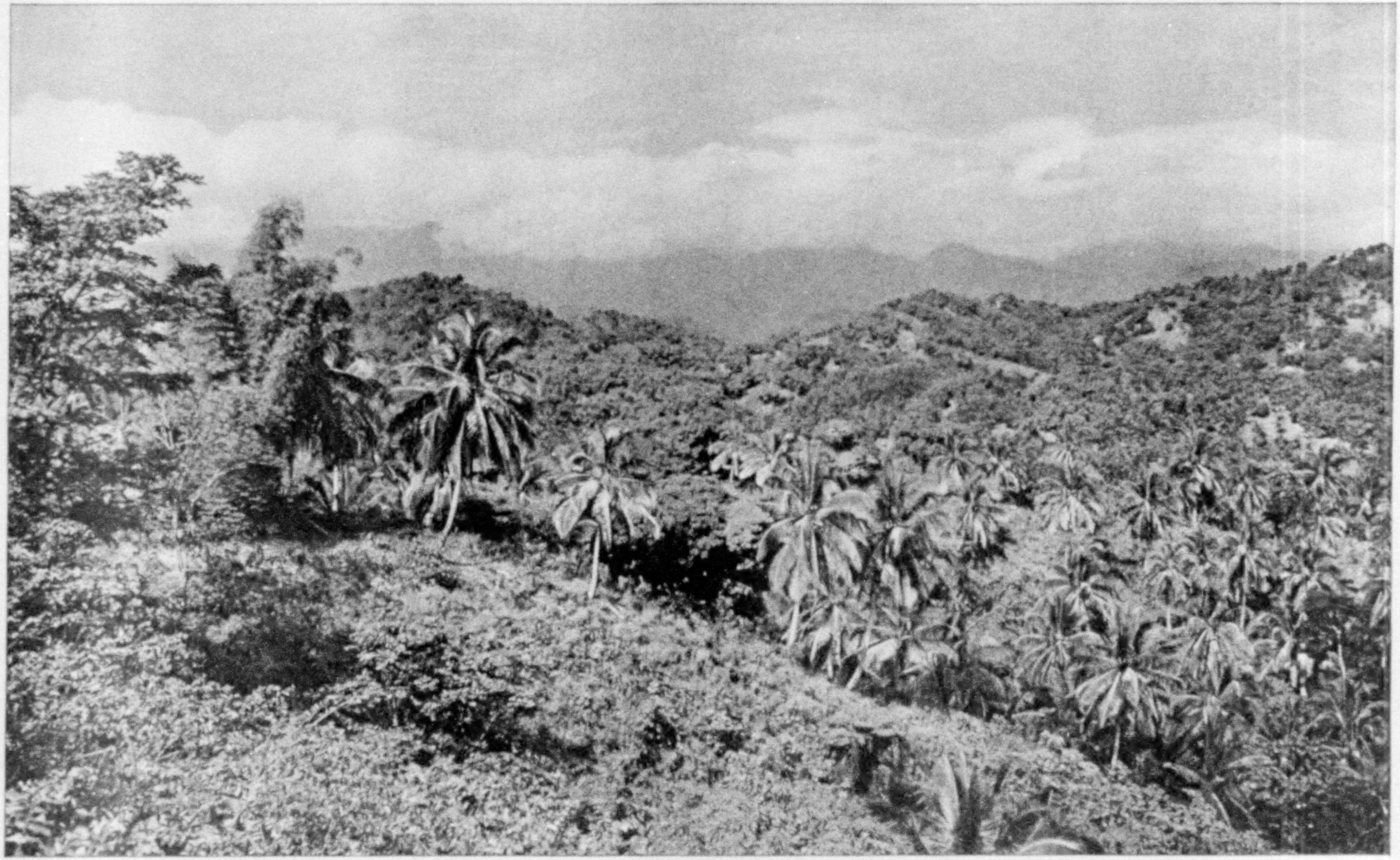
WEIGHING DYEWOOD FOR EXPORT

Logwood and fustic are products of the Jamaican forests, and have great economic value as sources of dyestuffs. Logwood trees bear blossoms which are very popular with bees, and "logwood honey" is an important by-product.



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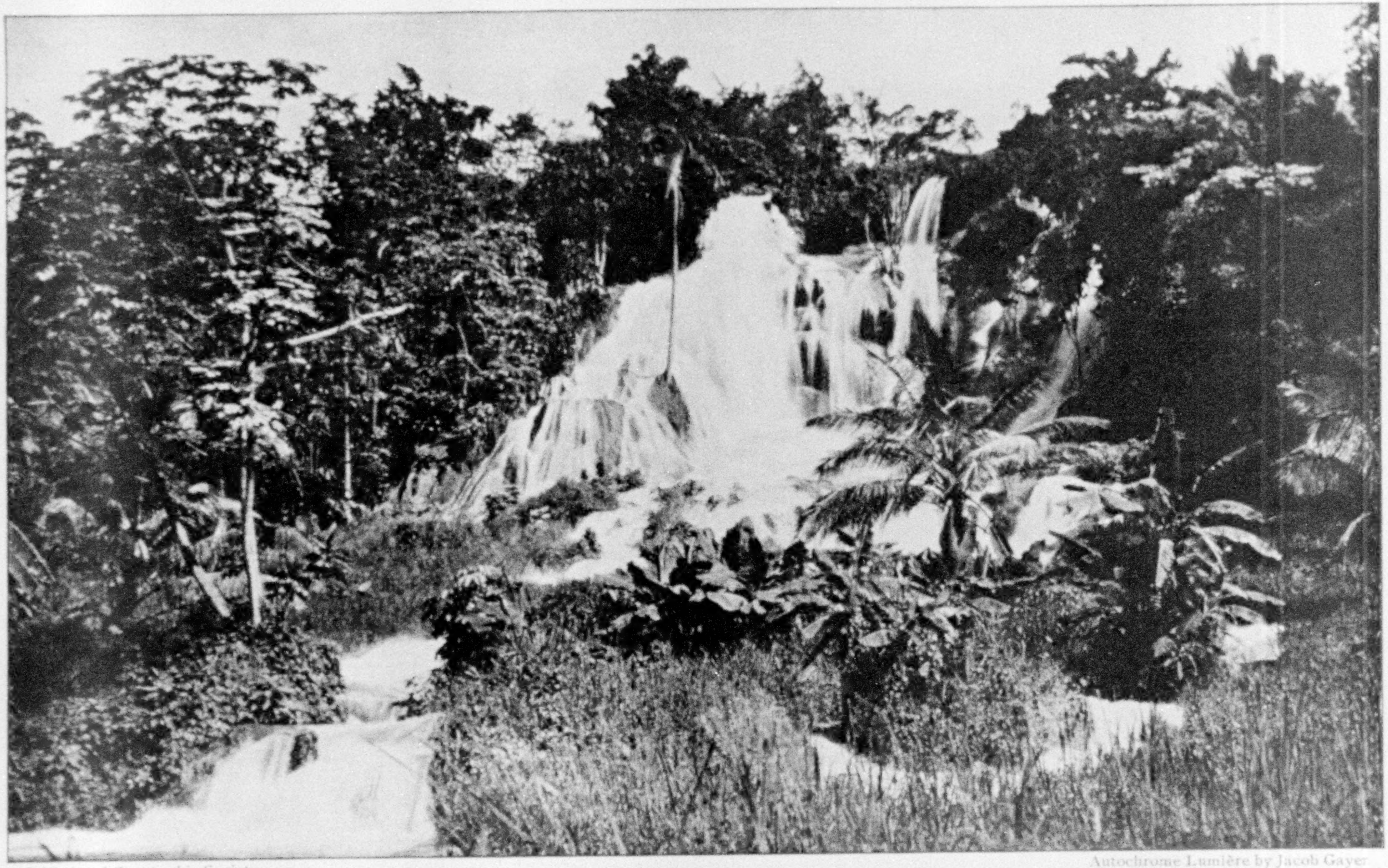
A TROPICAL LANDSCAPE

Eastern Jamaica has a much greater annual rainfall than other parts of the island and its vegetation is accordingly more luxuriant. The lofty mountain range in the distance intercepts all but the highest clouds, squeezing from them moisture for the lowlands.



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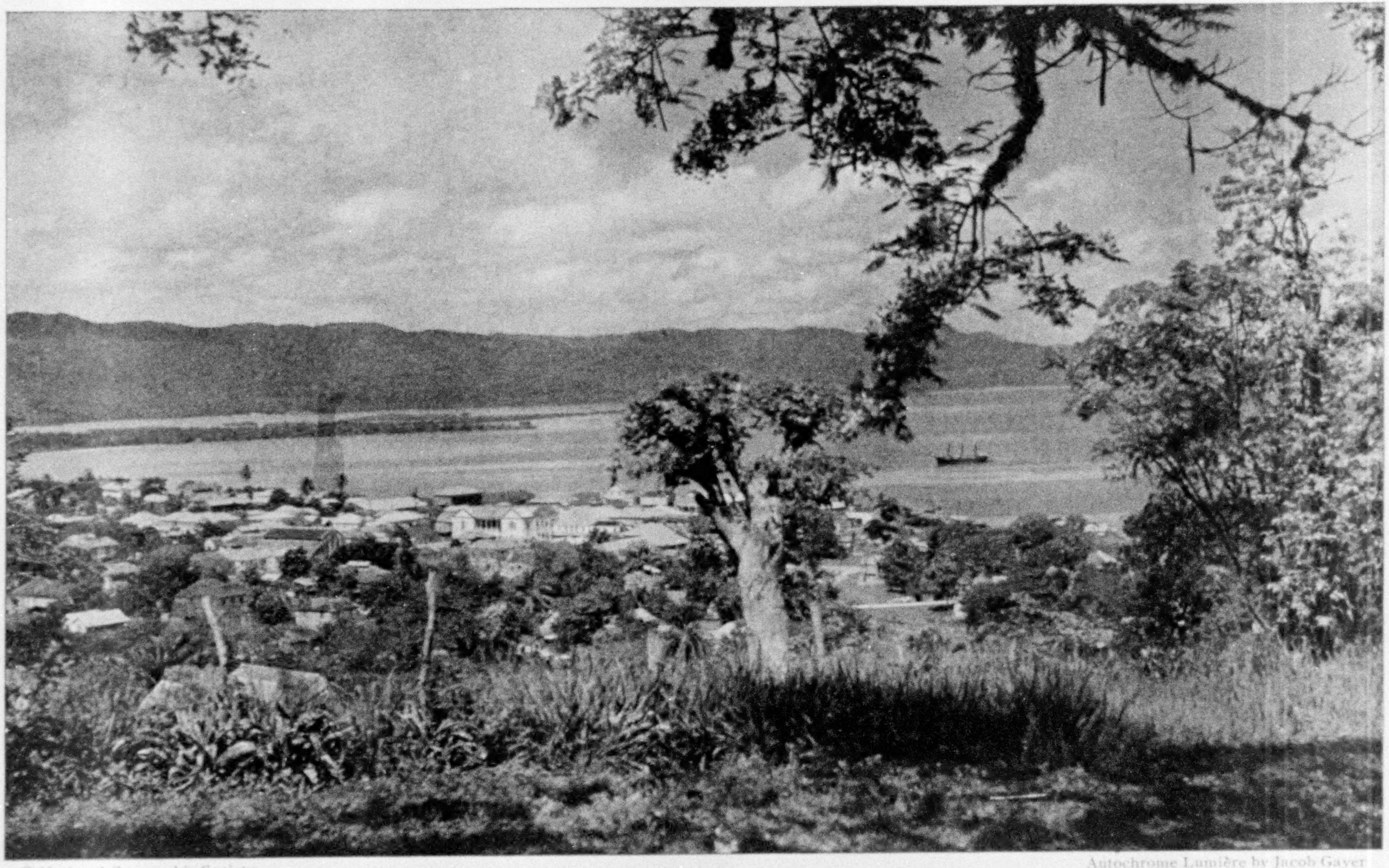
ROARING RIVER FALLS

The northern side of Jamaica has comparatively little coastal plain and the rivers make their way to the sea in a series of cascades. The towering palm seemingly growing out of the dashing waters in the foreground is most unusual.



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A GLIMPSE OF MONTEGO BAY

The Bogue Islands, seen at the left, are breeding grounds for large numbers of man-of-war, or frigate birds. The mangrove swamps on the islands are the habitat of the intertidal species of oysters illustrated on page 34.

THE FIRST AUTOCHROMES FROM THE OCEAN BOTTOM

Marine Life in Its Natural Habitat Along the Florida Keys Is Successfully Photographed in Colors

THE following eight illustrations are the first published natural-color photographs made beneath the surface of the sea. They represent many weeks and months of experimentation by Dr. W. H. Longley, noted ichthyologist, of Goucher College, and Charles Martin, of the photographic laboratories of the National Geographic Society.

The conditions encountered off Dry Tortugas, of the Florida Keys (see text, page 61), necessitated the development of a special technique for this unique photographic undertaking, because the ordinary autochrome plate would not register the moving life under water. It was necessary to hypersensitize all plates used in shallow depths, so that the under-sea exposures might be reduced to a twentieth of a second.

Owing to the dampness, the excessive heat, and the lack of sufficient power at Dry Tortugas to operate an electric fan properly, the sensitizing had to be undertaken each morning at 5 o'clock (the coolest time of day), to prevent the emulsion on the glass plates from melting.

FLASH-LIGHT POWDER SUPPLEMENTS SUNLIGHT FOR DEPTH PICTURES

When the scientists attempted to make autochromes at depths of as much as 15 feet, it was found that, owing to the greatly reduced power of sunlight, even the hypersensitized plate would not give satisfactory results. It became necessary to supplement and intensify the sunlight. Mr. Martin, therefore, constructed a flash-light-powder mechanism which could be discharged by the submerged photographer at the exact moment of his finny subjects' best posings. The additional illumination made possible autochromes on plates which had not been hypersensitized.

One problem which had to be solved was to synchronize the discharge of the flash-light powder with the camera shutter, so that the latter would be wide open at the instant that the flash had reached its illumination peak.

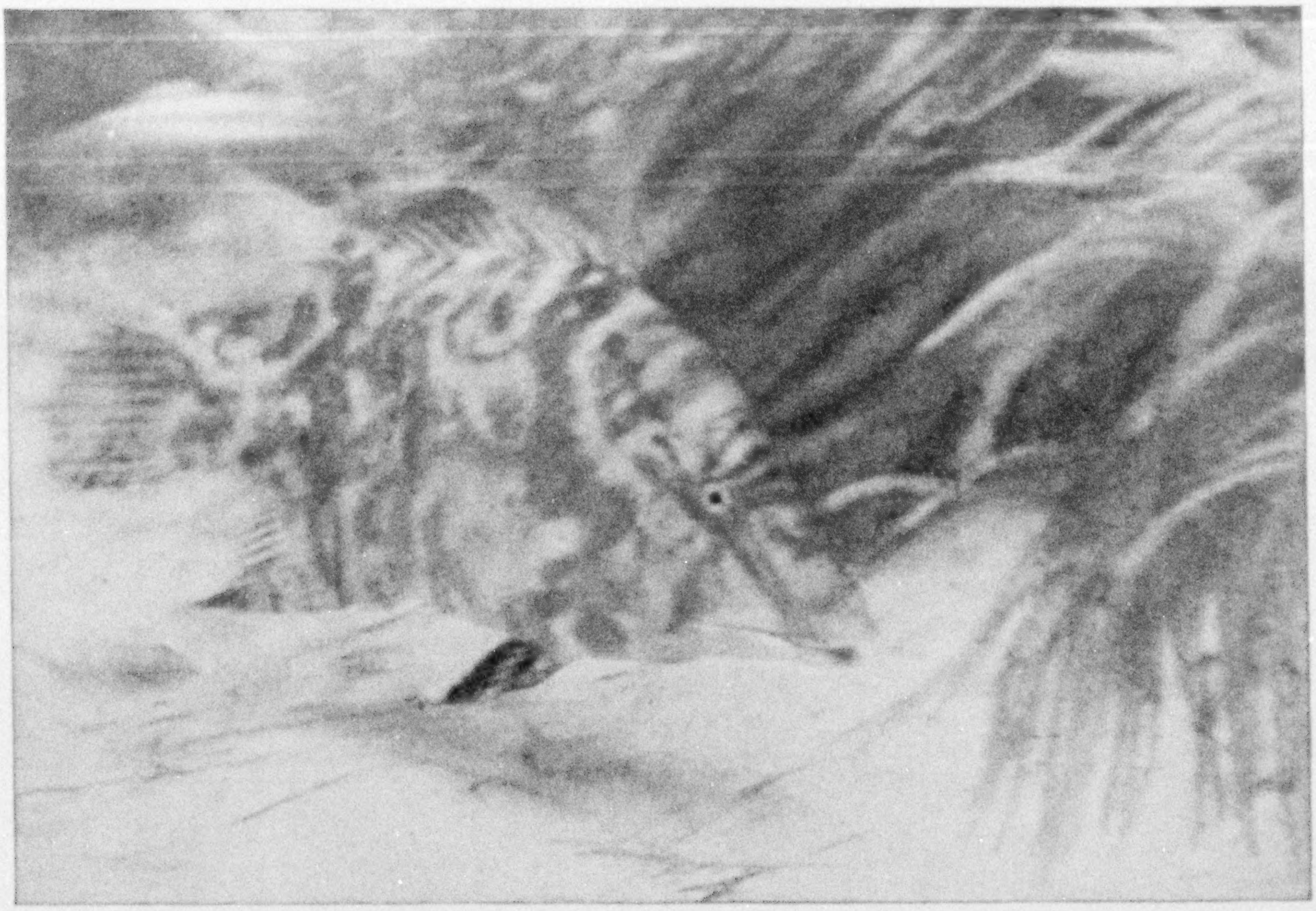
A pound of magnesium powder was used for every charge. The ignition of such an amount of dazzling explosive on a dory piloted by two men, who were forced at the same time to follow the shadowy movements of the diver with his camera far below, was more than human nerves could stand. Especially was this true when it sometimes happened that the men in the boat had to wait for two or three hours, every moment anticipating the blinding and deafening detonation. They could never know at what instant the diver would find his quarry in the desired position with respect to his lens.

To overcome this nerve-racking suspense, three small pontoons were constructed to support a dry-cell battery, the flash-light powder, and the reflector (see pages 73-74). The contrivance, floating upon the surface and guided here and yon, could be handled by the diver himself, leaving the men in the dory free to follow their colleague under sea at a safe and comfortable distance from the powerful explosive, yet near enough to maintain the necessary flow of air pumped to the man beneath the surface. The mere setting of the electrical connections, however, within a few feet of the big charge of powder was a hazardous undertaking.

On one occasion Dr. Longley was seriously burned and incapacitated for six days by a premature explosion of an ounce of powder. Had it been a full charge, the accident would probably have been fatal or resulted in permanent blindness.

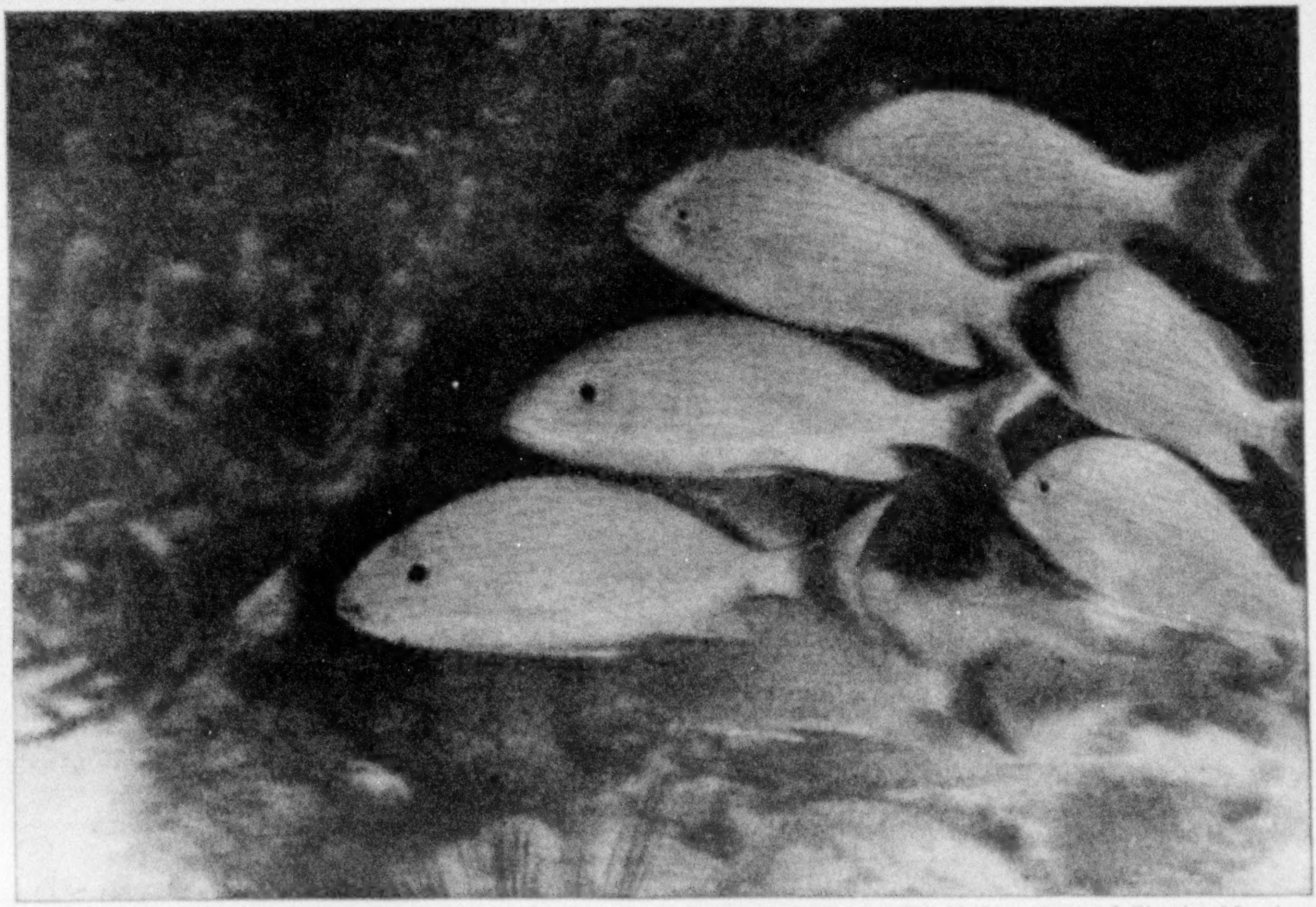
The camera used in making these autochromes was inclosed in a brass case with a plain glass "window" in front of the lens. A supplementary hood was fitted above the regulation reflector, and by means of an acute-angle mirror the photographer was able to focus his instrument, looking directly in front of him instead of bending over the camera—a movement which would have been extremely difficult while wearing the diver's helmet.

By untiring effort and patience came success in a new field of natural-color photography.



HOGFISH IN THE BANDED PHASE, RESTING AMONG GORGONIANS

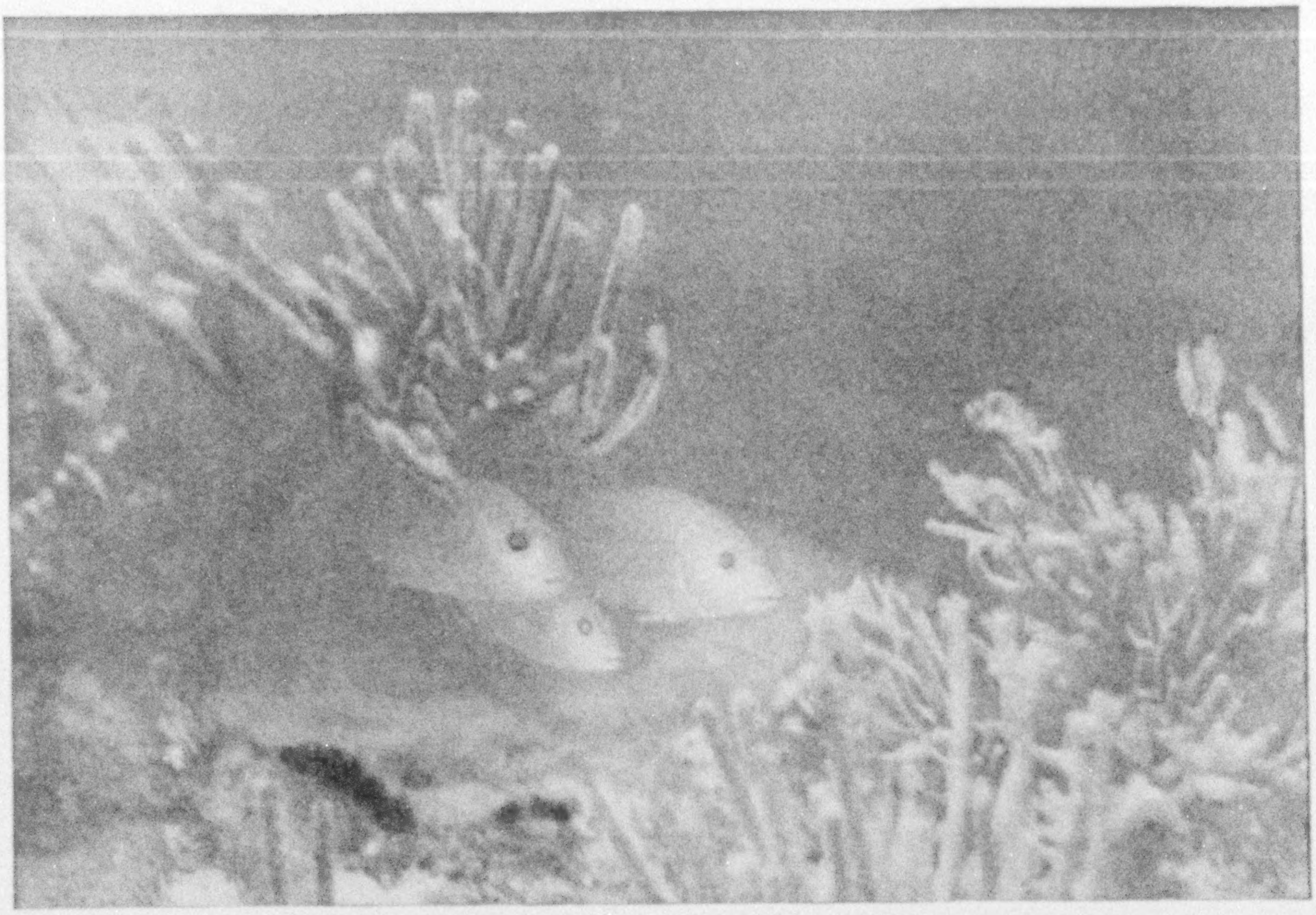
When swimming over clear sandy bottom this fish appears pale and almost a uniform gray. A diver may literally direct these fishes where he will by breaking sea urchins into small bits and scattering these where he wishes to lead his quarry.



© National Geographic Society Color Photographs by Dr. W. H. Longley and Charles Martin

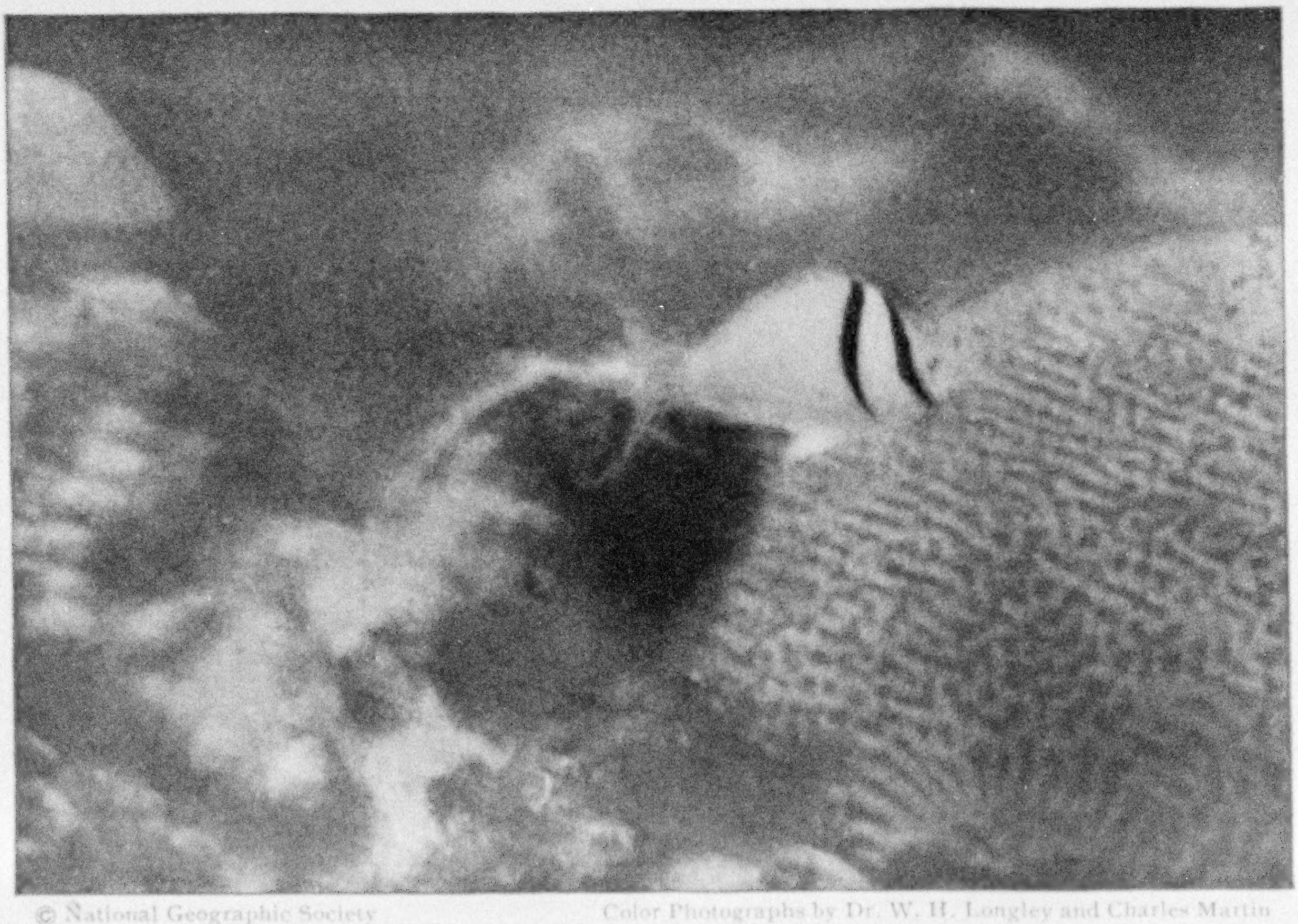
FRENCH GRUNTS

These fishes have the family habit of schooling among the gorgonians (a kind of coral which hardens when exposed to the air) and particularly among staghorn coral.



GRAY SNAPPERS AMONG GORGONIANS

These alert and active fishes are wary yet bold. They assume endless kaleidoscopic groupings determined in their form by the shapes of the objects among which they gather.



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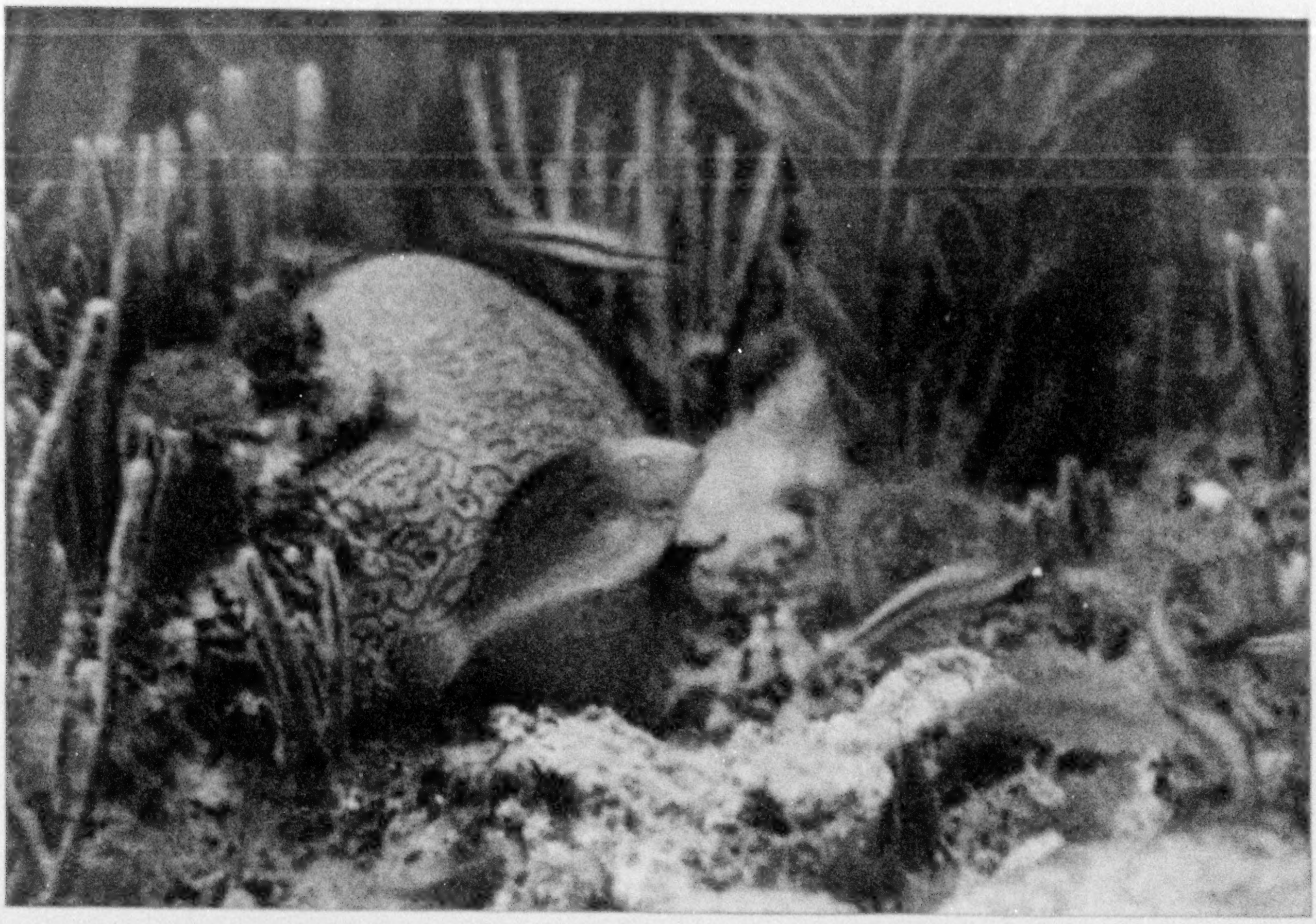
Color Photographs by Dr. W. H. Longley and Charles Martin

THE YELLOW AND BLACK PORKFISH, ONE OF THE MOST GAUDY OF REEF FISHES

Its vertical black bands disappear at night, for, like most of its warm-sea fellows, it changes color and under varying conditions appears in different guises.



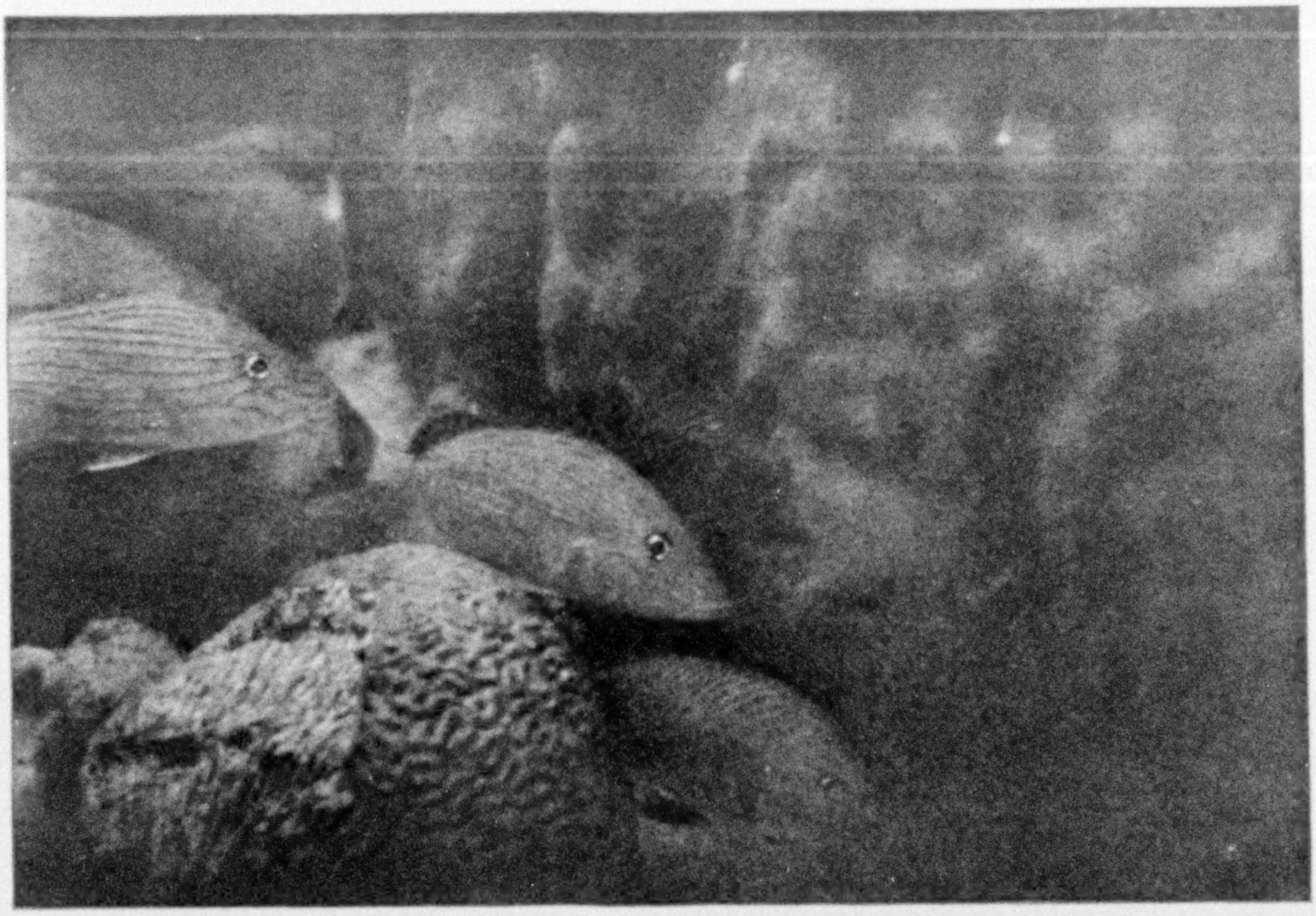
RED PARROT FISH IN THE BRILLIANTLY COLORED PHASE

This reef dweller is chameleonlike in its changes. It is herbivorous and, with many others as gaudy as itself, crops the herbage in submarine fields. The small fishes are chiefly slippery dicks.

© National Geographic Society Color Photographs by Dr. W. H. Longley and Charles Martin

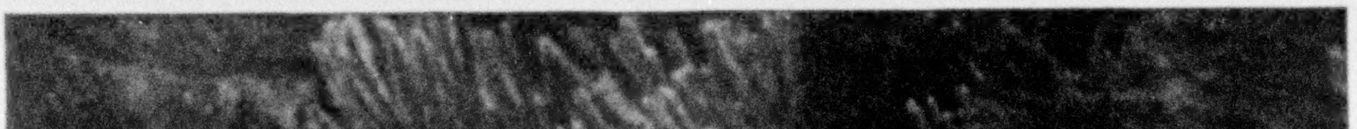
A SAUCER-EYE PORGY BESIDE A LARGE CORRUGATED BRAIN CORAL

Its eye is yellow, with a dark vertical bar upon it, and its face is washed with yellow. Branched gorgonians and brown stinging pepper coral appear in the background of this sea-bottom glen.



TWO YELLOW AND ONE COMMON GRUNT (BOTTOM)

The fish are swimming over a small head of brain coral and before massive Orbicella heads in one of the coral stacks about which small fishes swarm during daylight hours only.



© National Geographic Society Color Photographs by Dr. W. H. Longley and Charles Martin

GRAY SNAPPERS AND ONE YELLOW GOATFISH AMONG SEA FANS AND OTHER GORGONIANS

Like the grunts, these fishes feed by night and spend their days at rest, merely moving as sun and tide change, or as their enemies necessitate.

LIFE ON A CORAL REEF

The Fertility and Mystery of the Sea Studied Beneath the Waters Surrounding Dry Tortugas

BY W. H. LONGLEY, M. A., PH. D.

SEVENTY miles west of Key West lie seven low bars of shell and coral sand, the Dry Tortugas Islands, westernmost of the Florida Keys (see map, page 4). They owe their name to Ponce de León, who on the night of their discovery in June, 1513, captured 170 tortoises there, *tortugas* being the Spanish word for tortoises.

In 1565 that redoubtable Elizabethan, Captain John Hawkins, homeward bound from a profitable voyage in forbidden Spanish waters, knew them by their present name and visited them. He loaded his pinnace with birds of species that still breed there by thousands, took of the flesh and eggs of great sea turtles, and set down in his log notes that read like a page from Robinson Crusoe.

As Hawkins found them, so essentially the islands remain. Their permanent population includes only the three keepers, with their families, of the tall Loggerhead Light, guarding the western entrance to the perilous Straits of Florida.

Three months in the year a sun-baked resident warden, living alone in the babel of birds' cries and hissing wings, protects the terns on Bird Key during their breeding season, or their colony would probably have disappeared with the turtles, which are almost extinct (see pages 63 and 66).

For three months, too, the Marine Laboratory of the Carnegie Institution houses a small group of biologists busily engaged in research. Otherwise only the spreading bulk of old Fort Jefferson (see illustrations, pages 63 and 67), with the hurricane-twisted tangle of coaling machinery beside it on Garden Key, hints at changes that have occurred since Hawkins' visit and links the present with the more stirring past.

FAMOUS PRISONER FOUGHT YELLOW SCOURGE IN FORT JEFFERSON

The fort, dismantled and decaying, has played no important part in military story. No enemy gun was ever directed against it; but within its moated wall death has stalked as horribly as through the ranks of any beleaguered garrison.

Yellow fever appeared in August, 1867. Both ways it spread from the bed of the first patient. The whole side of the fort in which it broke out was evacuated and closed off from the remainder by partitions.

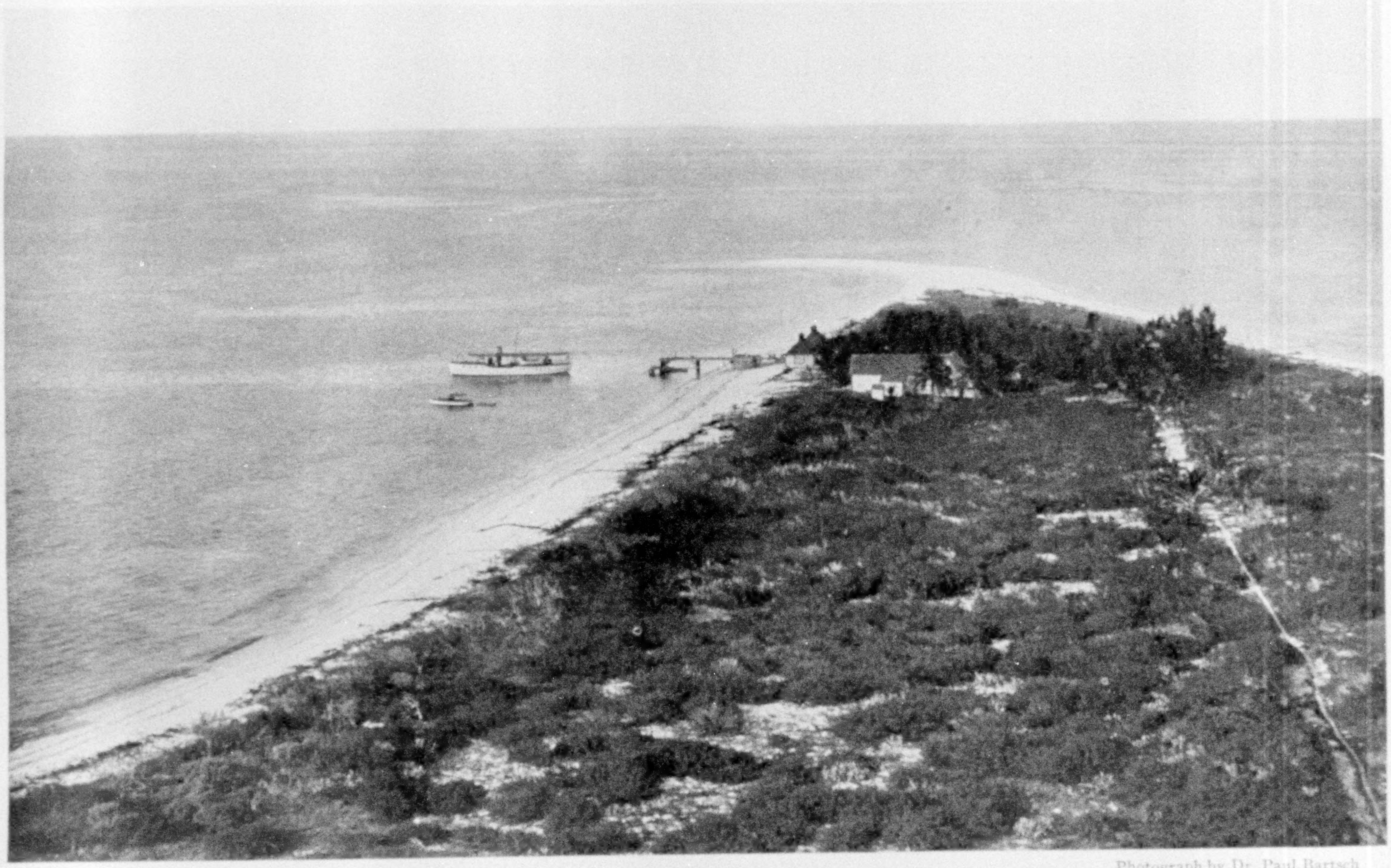
Right and left of the abandoned gallery the men nearest the partitions next fell ill, and the plague renewed its march. Hospital facilities were overtaxed; deaths occurred daily and burial followed at once with little ceremony.

All officers, including the surgeon, succumbed, and for a time all direction of medical affairs rested with a prisoner, the unfortunate Dr. Samuel A. Mudd, an alleged conspirator in the assassination of President Lincoln; for it was Dr. Mudd who, when awakened in the dead of night, at his home beside the Potomac River, miles below Washington, set the broken leg of John Wilkes Booth, the assassin.

STARTLING CHANGE IN FEW FEET ELEVATION

The land surface of the group as it stands is a scant square mile, but Tortugas undersea is far more imposing. If the sea bottom were elevated twenty feet, twenty square miles of land would emerge, the existing islands would grow much greater, and several of the family group lost within a century would reappear. New ones rising would form with the old an imposing atoll ten miles long and five wide, with three chief ship channels and several smaller ones connecting the lagoon with the open sea.

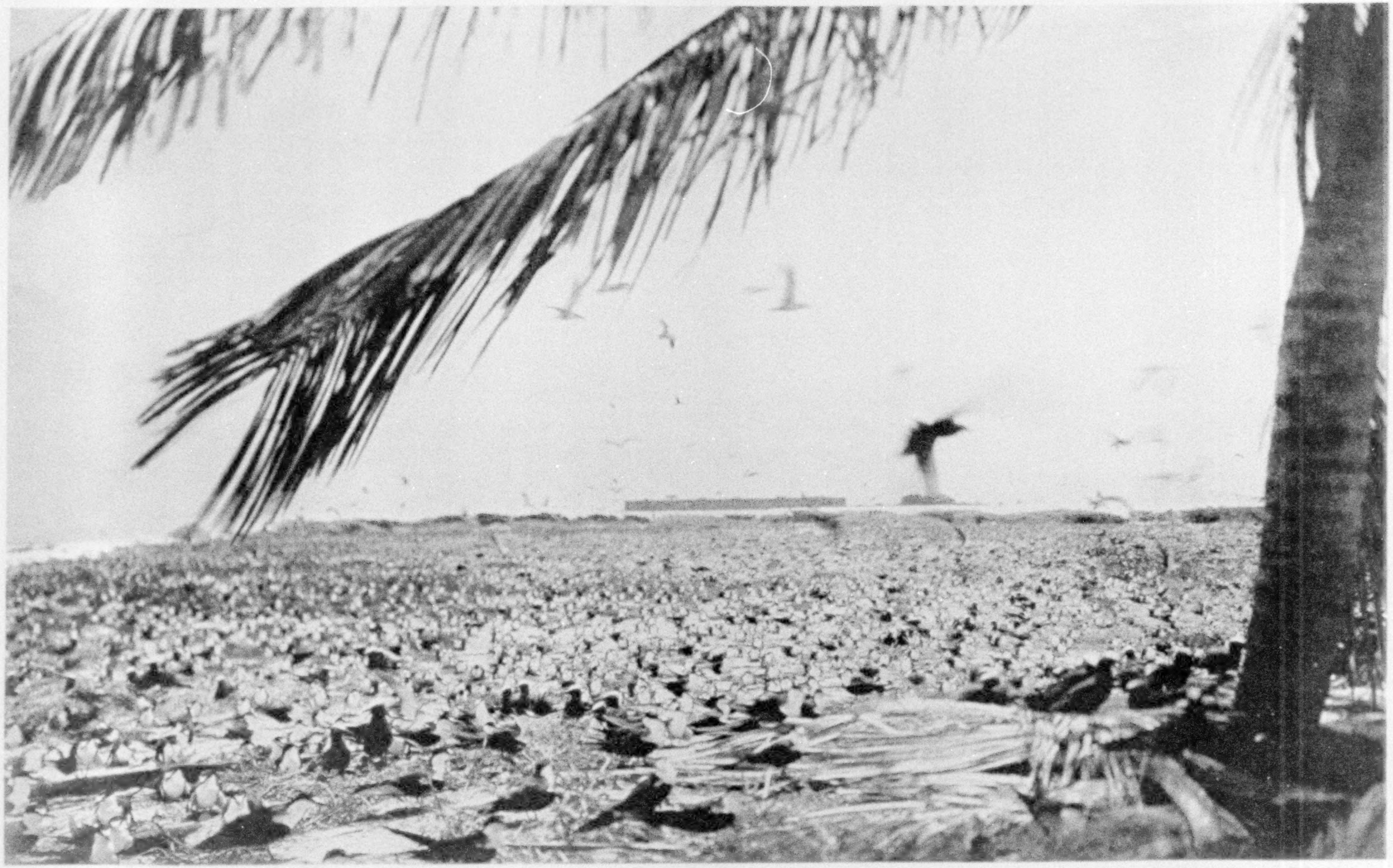
Such an atoll seems to have existed in the past, for the outer face of the great Tortugas Bank is scored at many points with submerged, but unmistakable, sea-cut cliffs of an old shore line, within which lies the ocean field where I have ranged freely in my diving hood, cultivating in particular the acquaintance of fishes that live there.



Photograph by Dr. Paul Bartsch

THE NORTHERN END OF LOGGERHEAD KEY: DRY TORTUGAS

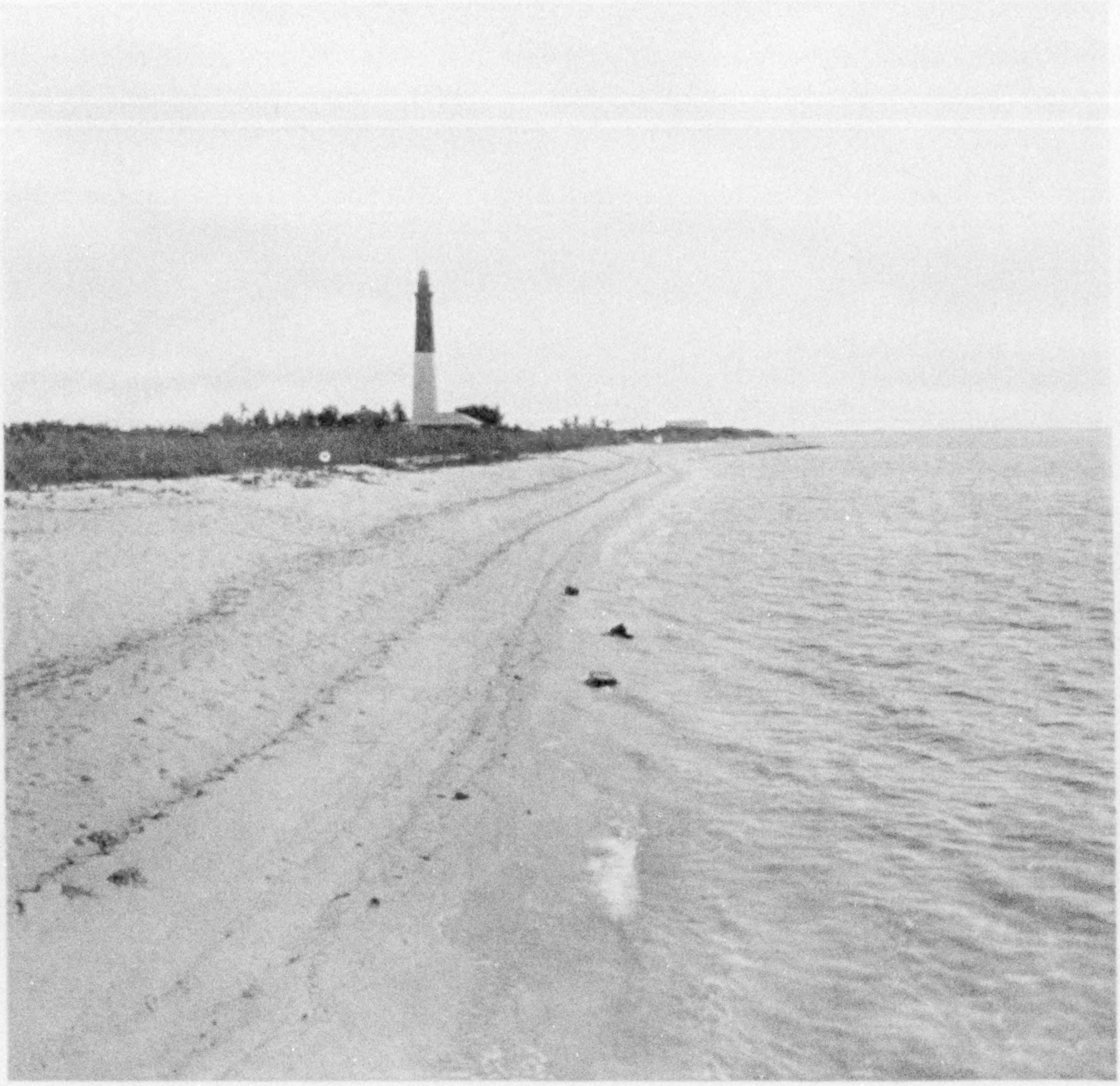
Note the hook-shaped extremity of white sand, which varies in size and shape with the seasons, owing to the shifting of the prevailing or trade winds. The vegetation in the foreground consists of bay cedars. The little light prairies between these cedars are being used for experiments in heredity with West Indian and Bahaman land shells. At the far end may be seen the plant of the modern Marine Laboratory of the Carnegie Institution nestling in a small grove of Australian pines and coconut palms (see page 61). The yacht lying off the dock is the *Anton Dohrn*, which brings the scientists from Key West, the nearest port to the Tortugas. The launch is one of several used for cruising about the keys.



Photograph by Dr. Paul Bartsch

SOOTY AND NODDY TERNS ON THEIR BREEDING GROUNDS: DRY TORTUGAS

The nests are on Bird Key, an islet lying three-quarters of a mile southwest of Fort Jefferson, which may be seen in the distance (see text, page 61, and illustrations, page 67). The key has been set aside as a national bird reservation (see, also, illustration, page 66).



Photograph by Dr. Paul Bartsch

THE LIGHTHOUSE FROM THE MARINE LABORATORY ON LOGGERHEAD KEY

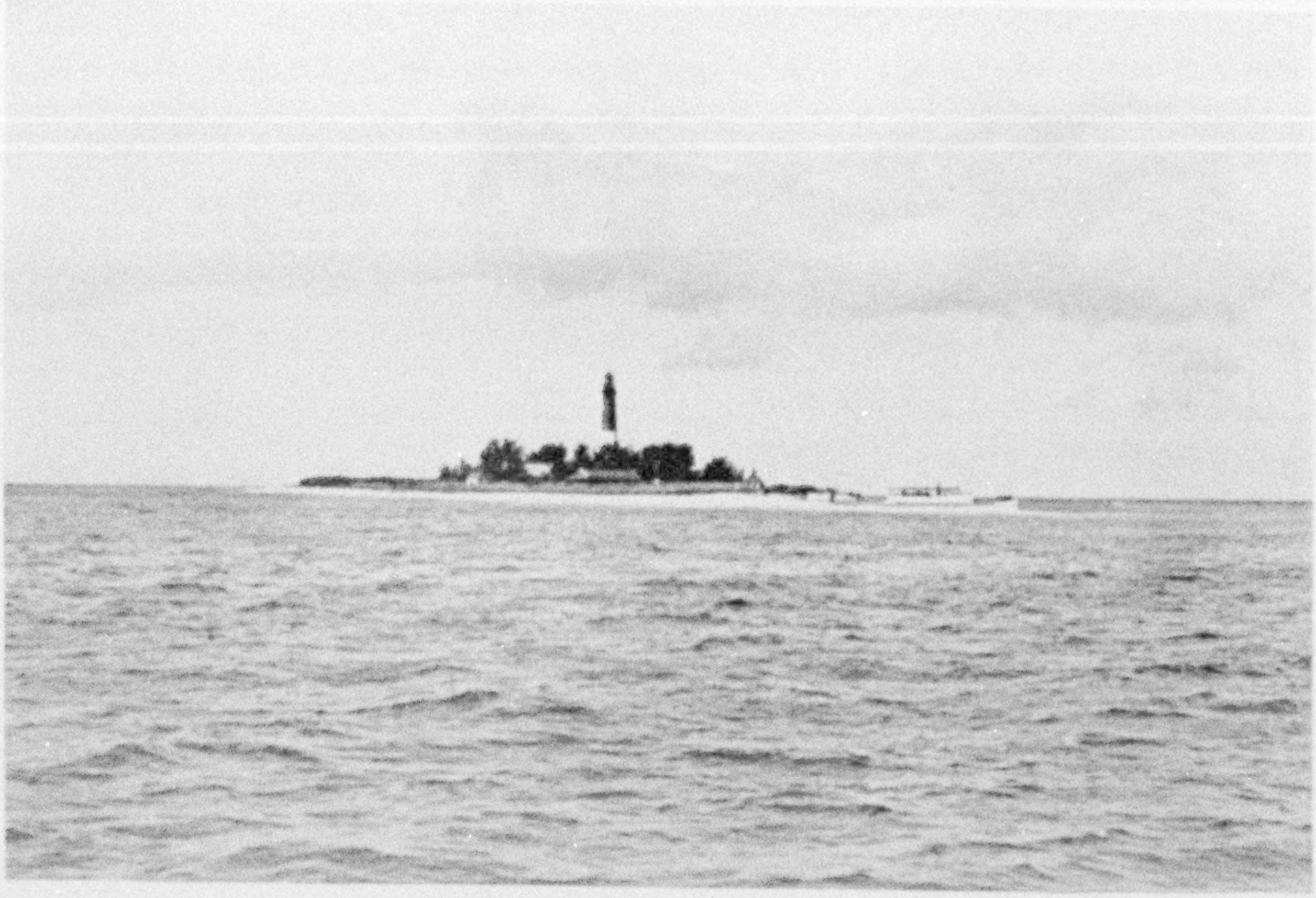
The shore line shows beautifully the combing effect of the sea. Flotsam and jetsam are distributed in parallel rows on the sandy beach. In these dark rows are the stranded remains of animals that live in adjacent seas. It is a rich collecting ground.

When walking the beach here, I sometimes find broad belts of minnows stretching without a break alongshore for hundreds of yards. In season and out, they are preyed upon by every sort of enemy. Least terns hovering overhead drop periodically upon them, beak foremost, straight as plummets, for hours systematically taking their toll.

Squids, slowly swimming backward, insinuate themselves among the masses that warily make way for them and close in again behind their truly dangerous end. How many the minnows lose to these treacherous creatures I do not know, but for long periods a single school of squids will hang upon their flanks, move in slowly, and then, each suddenly reversing its course, carry away an unfortunate fish in the firm grip of sucker-studded tentacles.

If the minnows draw away from shore, needlefishes catch them in their long bills, or the leagued and greedy runners fall upon them, forcing them for safety to spring into the air, there to be snapped up by noddy and sooty terns attracted by the commotion in the water.

If they move far inshore, even when predacious fishes leave them unmolested, the wind-harried waves toss them too far up on the sand for them to regain the



Photograph by Charles Martin

LOGGERHEAD KEY VIEWED FROM THE SOUTHWEST (SEE, ALSO, PAGE 62)

water by the most violent leaping. There they perish in windrows. On windward beaches I have found them so—dead, forty to the foot, at the water's edge—food for ghost crabs or for wading birds, whose innumerable tracks reveal the diligence with which they patrol their favorite beaches (see illustration, page 64).

A CORAL REEF AT LOW TIDE

When I visit the reef at low tide and on its seaward side discover the scuttling brittle stars, shrimps, crabs, and worms hidden beneath the dead corals I raise; when I put on my diving hood and go under, towing my attendant skiff behind me, and so walk the gravelly shallows with their myriad sea urchins, I am again in the presence of exuberant life.

Sometimes, too, I find the water foggy with swarming copepods

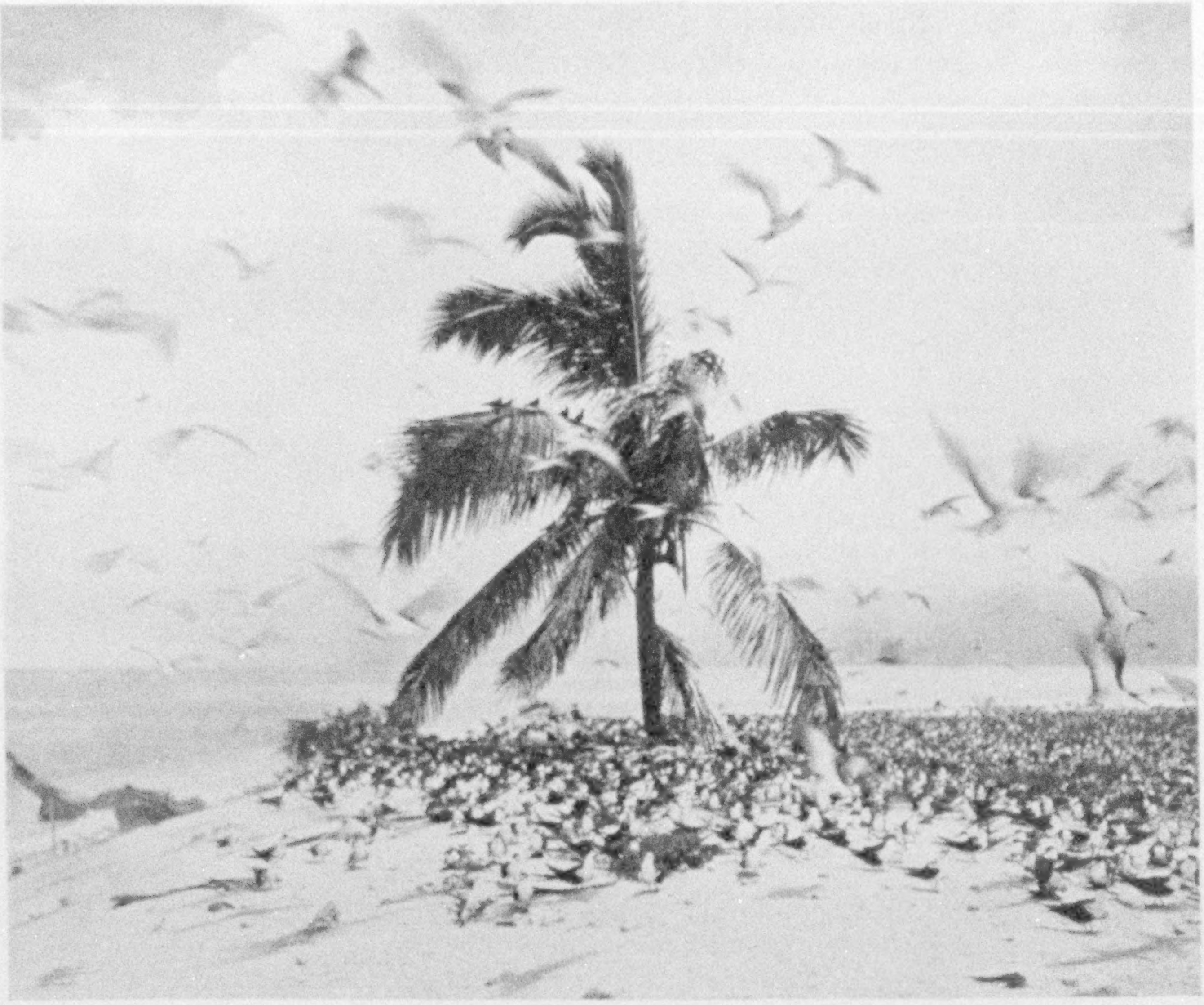
"Thick and numberless
As the gay motes that people the sunbeams."

It is they, with other lowly forms, that make available for the support of higher life the enormous mass in the gross of microscopic plant life in the sea. They feed upon microscopic diatoms, grow and multiply at their expense, are eaten themselves by larger creatures, and these by others pyramided upon them.

When I see small fishes, in a state of relative rest, rhythmically make the briefest of excursions with gaping mouth and become quiet again for the moment, I suspect them of feeding upon these creatures. Sometimes I am able to verify my suspicions completely. A thousand copepods by count is not an inordinate number for a small fish to capture in a few hours.

The minnows have their thousands, the copepods their teeming millions, but eggs and embryos floating in sea water can be compared in number, among living things, only with floating spores or windborne pollen grains drifting in clouds from dangling alder catkins or cones of shaken pine. They gather at the surface in trailing bands and patches—here broad, there thin, vague, and irregular—like dry blown snow gliding smokewise over dark pavements. The waters of the sea to the very bottom are filled with them.

Once only have I seen such free or general spawning as liberates them. As I worked one late afternoon on a great



Photograph by Dr. Paul Bartsch

THE WEST SHORE OF BIRD KEY, SHOWING SOME OF THE 33,000 BIRDS THAT BREED HERE ANNUALLY

The birds belong to two species. Almost all of those on the ground, with white breasts and black backs, are sooty terns. They lay their eggs on the sand, placing them just far enough apart to enable a bird with outstretched wings, standing over them, to avoid the tips of its neighbor's wings. The dark birds with the white caps, in the coconut tree, are noddy terns, which like to make their nests in bushes. The object in the lower left corner is not a wreck, but the stump of an old palm tree.

sandy tract, photographing fishes that live there, I noticed what seemed merely a tiny trailing cloud of turbid water drifting from the bottom and going down with the tide. One of the small fishes about me had raised it, I thought, when it overturned a pebble in the search for food.

THE BIRTH OF A BILLION

But soon another puff appeared, and after a while a third. Buried clams or holothurians blowing the sand from their burrows, I assumed. But, as other clouds continued to rise, to swirl, and mingle, I realized what was happening.

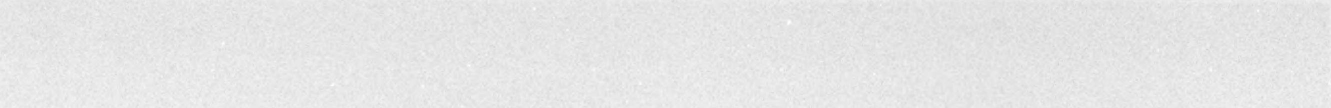
The number of centers of discharge increased. The lower water grew hazy, and then the higher, until my view was greatly restricted.

In the experience two things greatly impressed me. First, in the apparent desert an abundance of life lies hidden. Second, as spawning actually occurs here, there is exceedingly small chance of any egg remaining unfertilized.

But how the discharge of germinal products is synchronized I am still wondering. As I saw it, the zone of activity did not move down with the tide, as it should if individuals were stimulated by the secretions of their neighbors to throw out their own eggs and sperms.

On the days when they most attract attention at Tortugas, the commonest egg

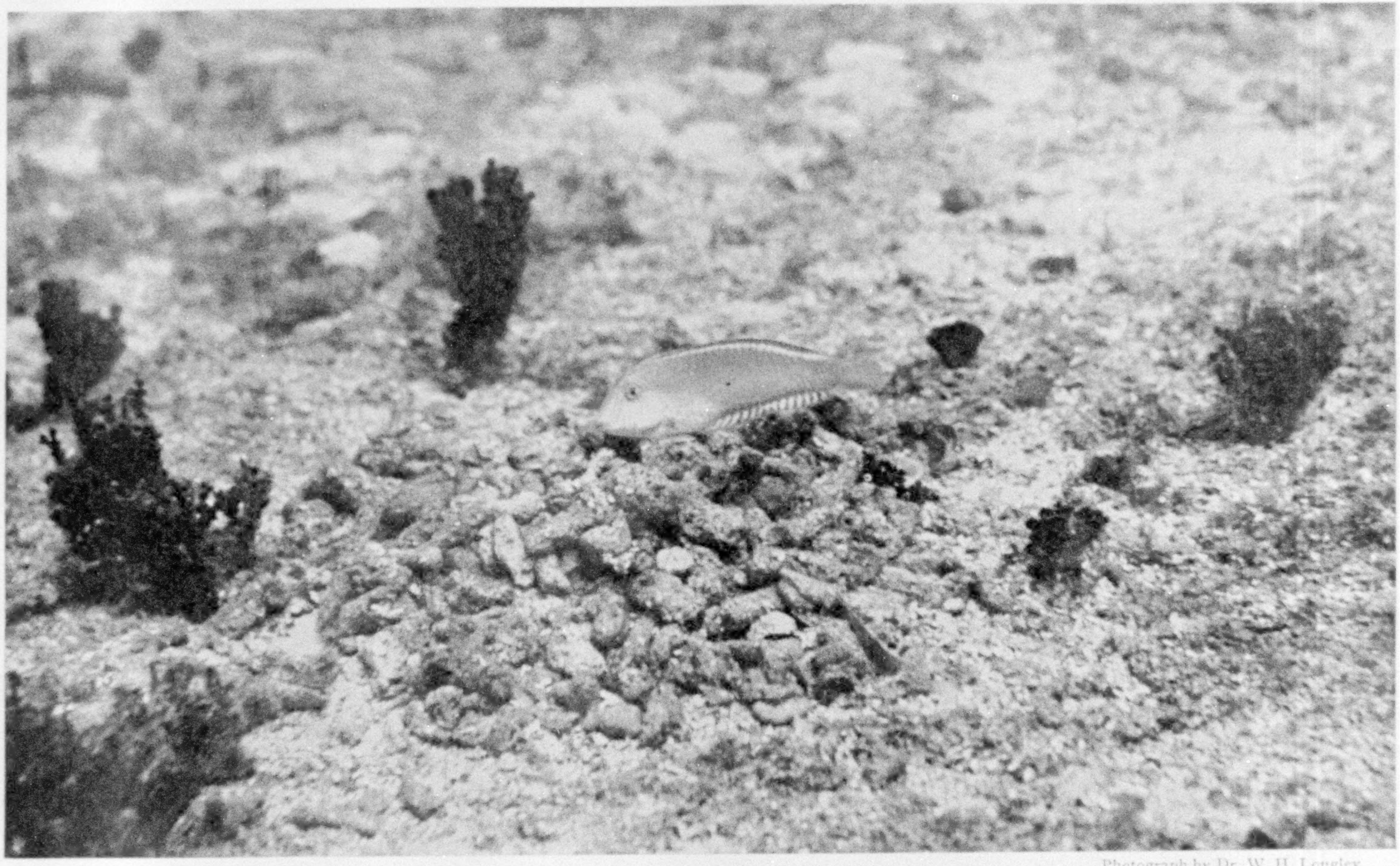
FORT JEFFERSON AND ITS MOAT (SEE TEXT, PAGE 61)



Photographs by Clarence R. Shoemaker

THE COURTYARD FROM THE TOP OF FORT JEFFERSON

At the left is a lighthouse, which has been erected upon the top of one of the spiral staircases. The ruin of the top of another spiral staircase appears in the foreground.



Photograph by Dr. W. H. Longley

A RAZOR FISH (*Xyrichthys psittacus*) ABOVE HIS CORAL DEN

The bits of dead coral gathered by it all around are enough to fill a water pail, and inclose a small crater, into the soft sand at the base of which the fish dives and hides from its enemies (see text, pages 73-74). Other fishes related to it, such as the slippery dick (*Halichœres bivittatus*), when feeding, move stones as readily with their mouths as does the razor fish, but have no instinct whatever for heaping them together.

is a pink one easily visible to the naked eye. It belongs to some gorgonian, as its odor testifies when it is crushed between the fingers, or as the very odor of the water in which the eggs are dipped up indicates.

In a great outburst of reproductive activity on the night before, very many, perhaps all the mature colonies of at least one of the common gorgonians, must have discharged these together.

But for concentration of its spawning within narrow limits and for intensity of expression of the reproductive bent, surely nothing can surpass the various palolo worms, of which one is very common at Tortugas. Its annual breeding swarm is one of the outstanding events of the year in the life of the reef population.

WHEN NATURE DEMANDS ACTION

The Tortugas palolo at maturity is a segmented worm about eight inches long. In appearance it shows marked resemblance to the clam worms of northern shores. It lives chiefly in burrows, originally made by other organisms, in the dead corals of the reef, and little is seen of it by one who does not take hammer and chisel and carefully chip it out.

It is marvelously attuned to its surroundings. Each year, usually within three days of the last quarter of the July moon, it forgets its customary shyness. Then, before daylight, on the same day, practically all, male and female alike, protrude the hind end of the body from their hiding places. These exposed ends, which contain all their developed egg and sperm cells and may measure more than half the length of the animal, they then proceed to cut off in a single piece by vigorous twisting which breaks the worms in two.

The severed tails swim to the surface and may be found there at dawn in myriads. Scarcely a square foot over stretches of miles fails to show one or more of them.

With the greenish female pieces the reddish males continue to writhe till sunrise, in the mazes of a witches' dance. Then at sunup, within a few minutes, all burst, spilling the germ cells in the water, which becomes at once turbid with them.

Their office discharged, the shrunken remains of the fertile segments sink to the bottom and are lost. After a free-swimming life of a few days, the larvæ follow them to the depths to take up their buried life.

The mutilated worms, in their burrows, grow their missing parts anew, and young and old alike remain in seclusion a twelvemonth more.

THE FEASTING HOUR OF THE STRANGER

This great natural time of reproduction lasts only a few hours at most, but the period of the swarm is for many of the fishes a combined field day, Sunday-school picnic, and Fourth of July. Grunts, that eat worms freely at all times, are gorged with them. Groupers, that have tasted none for a year, are filled to repletion, their trim lines marred by swollen maws. Snappers, that usually feed from the bottom and at daylight quit as promptly as a journeyman throws down his tools, are stirring actively long after their usual hour, with backs and fins breaking the surface in deep water.

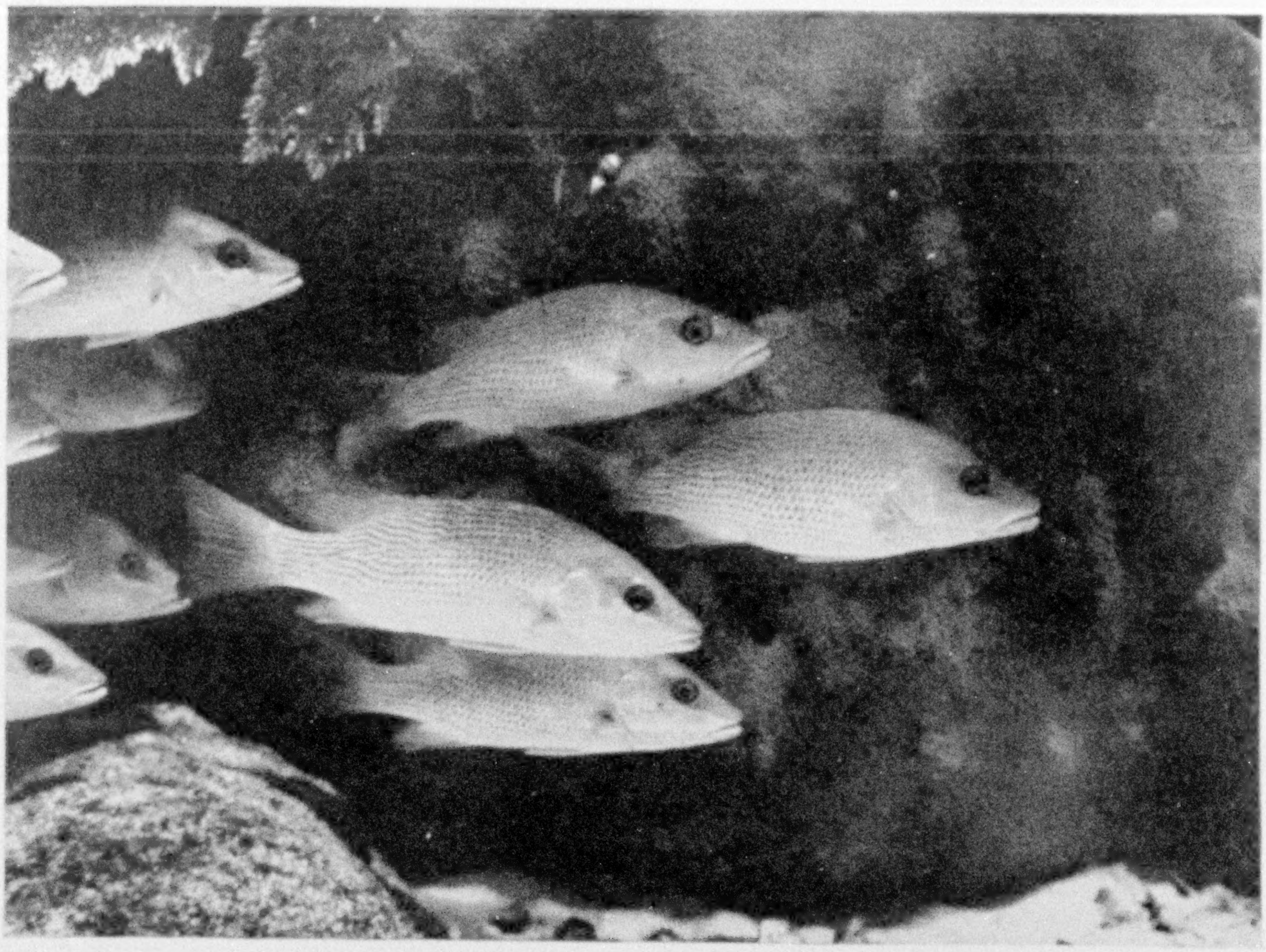
The tax levied upon the helpless worms is enormous. Twenty each was the estimated spoil of fourteen snappers examined, and fishes of their size and sort occur on the reefs by scores of thousands. Thus the inroad upon the sum total can be imagined.

BENEATH-THE-SURFACE OBSERVATIONS

The fertility of the sea is one thing, its mystery another by which I am always impressed. Here I think not of the vast reaches on which one may steam for a week and see not even a wisp of friendly smoke on the horizon; nor even of life in its deeps, from which our dredges bring up rare samples of the bizarre creatures that people them.

What happens in ten feet of water is, perhaps, less well known than land events anywhere except in the crown of the tropical forest. Even if we knew the diurnal round of life at this slight depth—which we do not—night life is so different that an account of it would make a tale both novel and thrilling.

Except audibly, even in the jungle, there is not greater change at dusk and dawn. Before I leave my work underwater in the late afternoon I feel it impending.



Photograph by Dr. W. H. Longley

GRAY SNAPPERS, IN A MASSED FORMATION, BEFORE A GREAT ORBICELLA HEAD AND BELOW A BROAD SEA FAN

Groupings such as this are formed again and again while one watches, as the leading fishes turn one after another at intervals and rejoin the rear of the group.

At noon the timorous squirrel fishes, whose great eyes and conspicuous shyness prove them creatures of night, are hugging their shelters close, except when the sucking ground swell, tugging them alternately this way and that, for comfort drives them from hiding (see page 81).

From a boat overhead a fisherman has for the most part only fleeting glimpses of them in the thick shadow of close-knit Acropora or the semidarkness of deep crevasses between massive heads of Orbicella. From my vantage point I see them clearly and more abundantly.

They are night feeders, whose behavior changes subtly as the light fails. As the hour of their release approaches, their apparent air of expectancy increases as imperceptibly, but as obviously, as lengthening shadows. They seem to ask, "Is it time? Is it time?" They venture out more and more from the gloom and first pass freely to the open in the twilight.

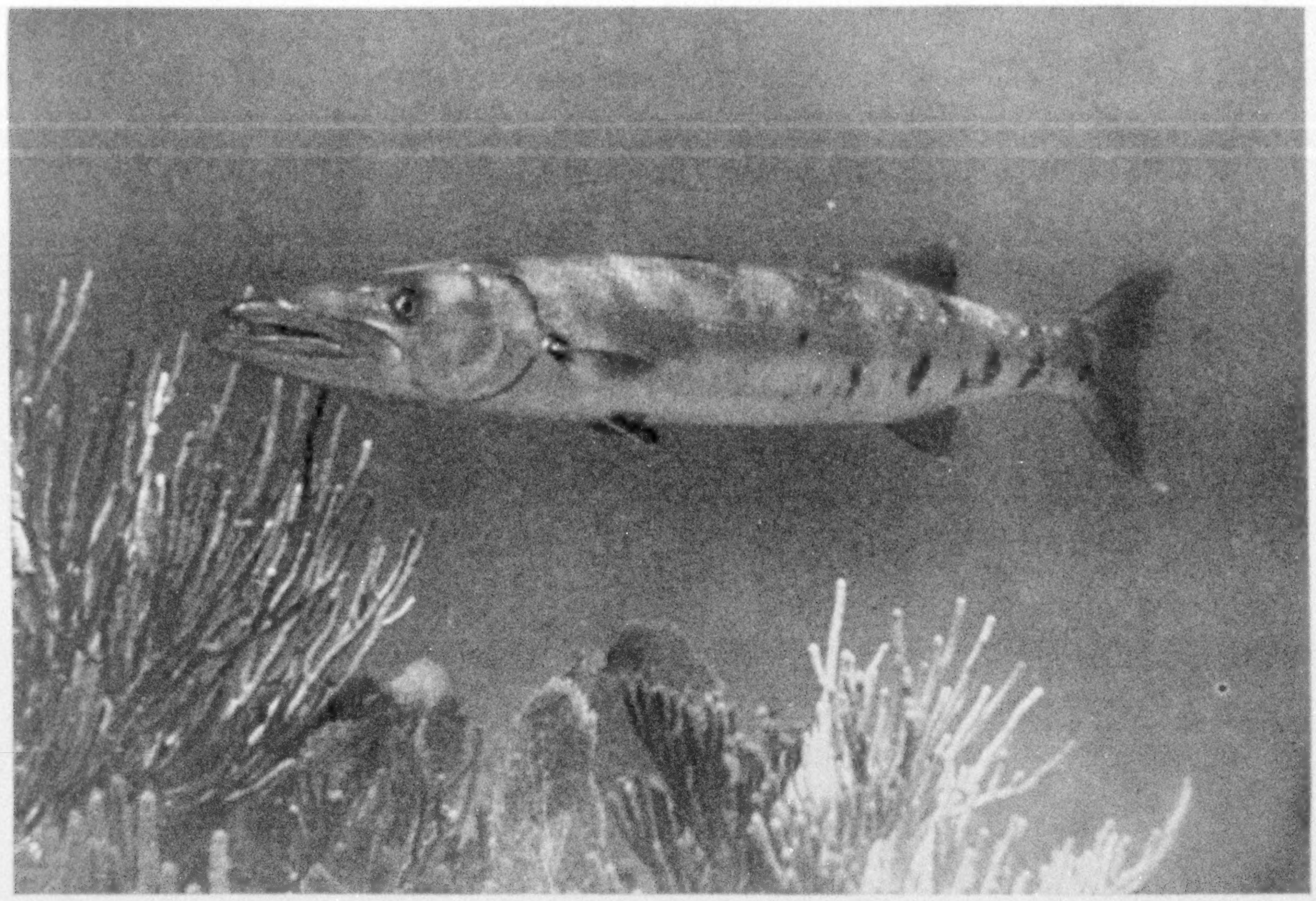
Out of the center of the lagoon, in sixty or seventy feet of water, with some of its sides nearly vertical, there rises a very shallow bank at Tortugas, called White Shoal. Its top is almost a desert. It is covered with broken fragments of staghorn coral, from the abundance of which I infer that it flourished there like the green bay tree two generations since, when a catastrophe as devastating as that which befell Pompeii, although of another sort, overwhelmed and destroyed it.

No new growth has sprung up. Gorgonians gain no permanent foothold there. The seaweeds are sparse and spindling. Some life doubtless hides in the rubble, but is relatively scanty.

HUNTERS OF THE NIGHT

At one end of the shoal, however, where the water is deeper, gray snappers (see Color Plates XIII and XV, and illustration above) are numerous. It is one of their choice schooling places.

Ten fish from this school, Dr. Waldo



Photograph by Dr. W. H. Longley

A GREAT BARRACUDA DWARFING THE "SHRUBBERY" OF THE REEF BOTTOM

Such fishes ordinarily show little more than mild curiosity in a diver's movements. The shearing power of the barracuda's great jaws is remarkable and justifies his *nom de guerre,* Tiger of the Sea

Schmitt learned, had eaten in one night fourteen peculiar burrowing shrimps found only on muddy bottoms. Only one among 254 fish from colonies elsewhere had found even a single shrimp of the same sort.

These fourteen shrimps had not been captured on the White Shoal, even at the deeper end, where the snappers gather. To find them, the hungry hordes, fasting twelve hours, had spilled down from their barren uplands, a scourge of God to the defenseless dwellers in the cozy channels roundabout.

The abundance and wide distribution of the gray snapper permit this comparison between the catch of fishes of the same kind in different places. But since there occurs with the gray, at many of its gathering places, a yellow snapper, called the schoolmaster, we may with equal ease compare the catches of different, but closely related, fishes schooling in the same place. The results are no less interesting.

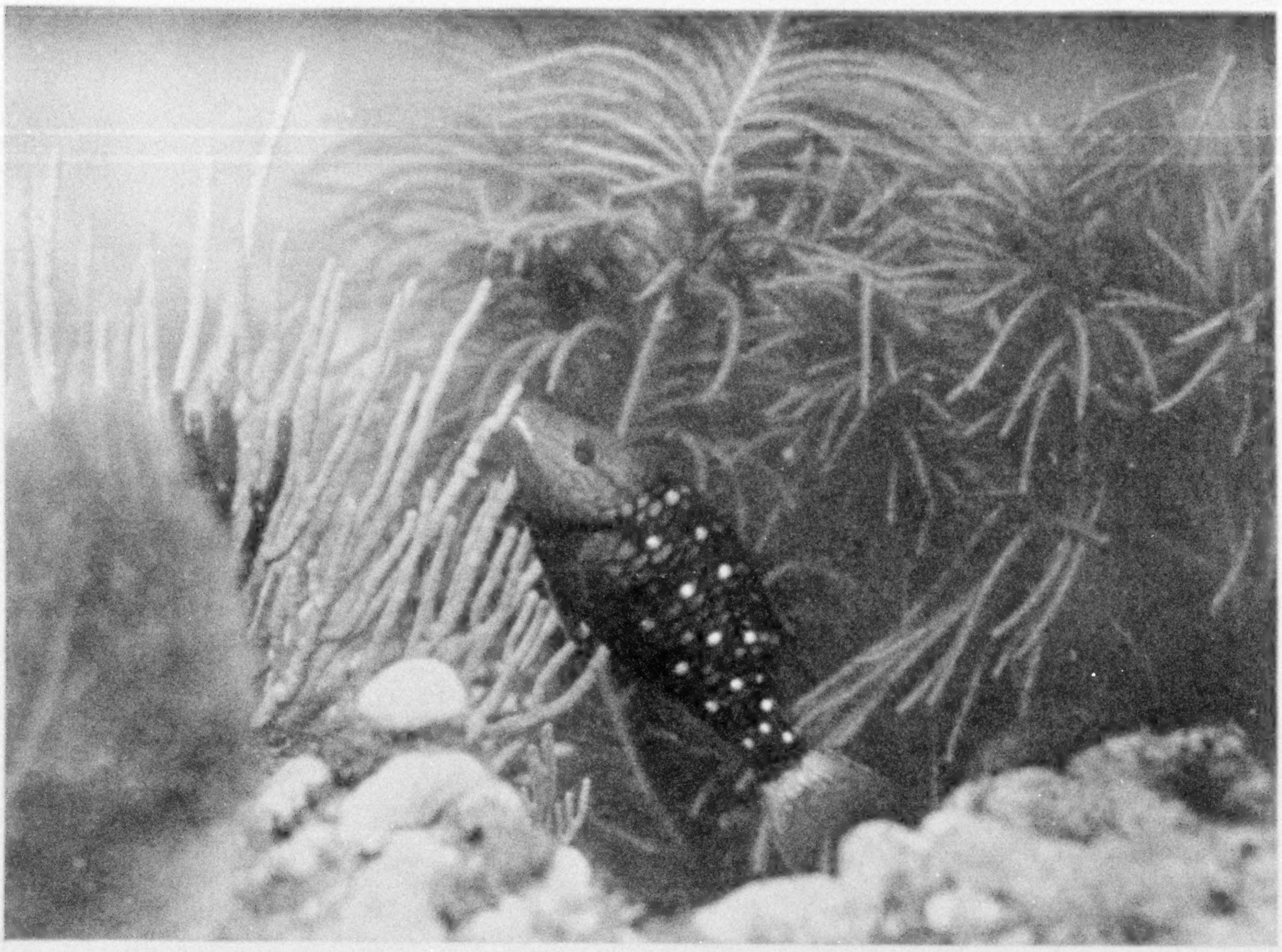
More than three hundred of the fishes were studied. With very little practice, it would be easy to tell by which of the two species the food examined had been gathered, in spite of the fact that it is, in a way, precisely the same sort of material throughout.

Small fishes, with crabs and shrimps, and more than an occasional small octopus make up the most of it. But when it is closely examined it appears that there are particular kinds of crabs that are found nightly by more than a third of the schoolmasters, but by less than one in a hundred of the others.

Checks applied show that this difference is not due to food selection by the two species, but is explained by difference in the type of feeding ground they seek under cover of darkness. So, bit by bit, we decipher the record of the night's movements.

THE URGE OF HUNGER

The behavior of animals that do not stray widely, like the predacious fishes, is quite as strikingly changed by the coming



Photograph by Dr. W. H. Longley

A RED PARROT FISH MOMENTARILY STANDING ERECT, PERHAPS TO TAKE AN OBSERVATION

The background consists of "sea feathers" (finely branching gorgonians).

of night. Corals I have never seen expanded by day turn out their infolded disks and open their numerous mouths to feed. Some of the anemones that in the light are mere mounds of flesh extend their shortened columns until they become tall and thin, carrying high, like graceful palms, their crown of far-flung tentacles.

Among gorgonian branches knotted basket stars uncoil their long-branched arms, instinct to their delicate tips with life and motion. From under overhanging or hollow coral heads spiny lobsters, with waving antennæ, come out to walk the reef, and their stalked eyes seem to burn with phosphorescent light under my lamp.

Round-shouldered crabs throw off the cover of sand under which they have been hidden. Red shrimps, concealed more cunningly by day than the red glass-eyed snapper, clamber over the reef patches.

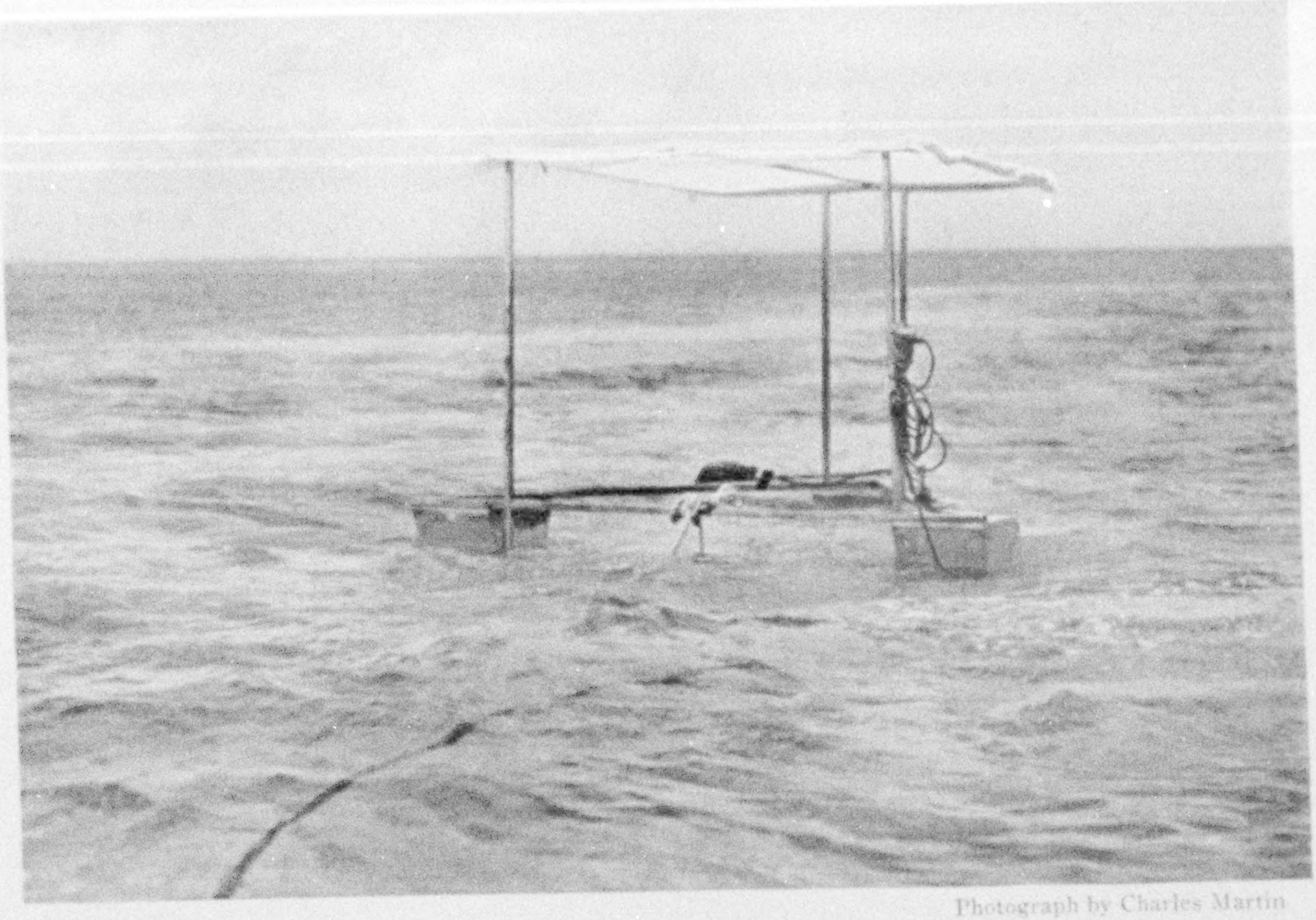
Even some of the bivalve mollusks, like Lima, much like the edible scallop, become active, creep out from chinks in the coral, and with clapping shells readily change their place. One I kept in a pile of stones in an aquarium came out each evening and swam up until, like a weathercock, it stood perched on the top of the heap.

PROWLERS OF THE DAY

And while all these things are happening, where are those fishes which hither and yon, singly or in slow-grazing schools, passed and repassed, examining every nook and corner of the field the day long?

This, of course, is a difficult question. These fishes do not feed by night, and so there is no telltale evidence to be recovered from them in the morning. Their behavior in confinement, and fleeting glimpses I have of them as I float over the reef at night, flashing a powerful searchlight on them and catching them unawares, are all I have to base conclusions upon.

Regarding many labroids there can be little doubt. They hide themselves in the



Photograph by Charles Martin

APPARATUS TO SUPPLEMENT SUNLIGHT IN MAKING UNDER-SEA AUTOCHROMES

The three-pontoon float devised to carry the flash-light powder, seen in the middle of the triangle; the electric battery attached to one of the supports, and the white reflector. The picture shows the air hose and the bubbles coming up from the diver's helmet (see text, page 56).

sand. Species after species of Halichœres, Thalassoma, and other labroid genera, if given a little sand in the tanks, will bury itself in it at nightfall, to remain until sunrise. In fact, their reaction to approaching dark is so ingrained that I can at any time put them to bed by throwing a dark cloth over their aquarium and wrapping the sides with it.

This response is common to their race. They behave in Honolulu exactly as they do at Tortugas.

Other species creep away into holes in the reef. I see them narrowing their excursions from it as the light fails, and see them peeping from it at night. Some, too, when night finds them, fling themselves down beside some boss upon the bottom that protects at least the side toward it. So I often see parrot fishes (see Color Plate XIV and illustration, page 72) in their bottom-matching patterns.

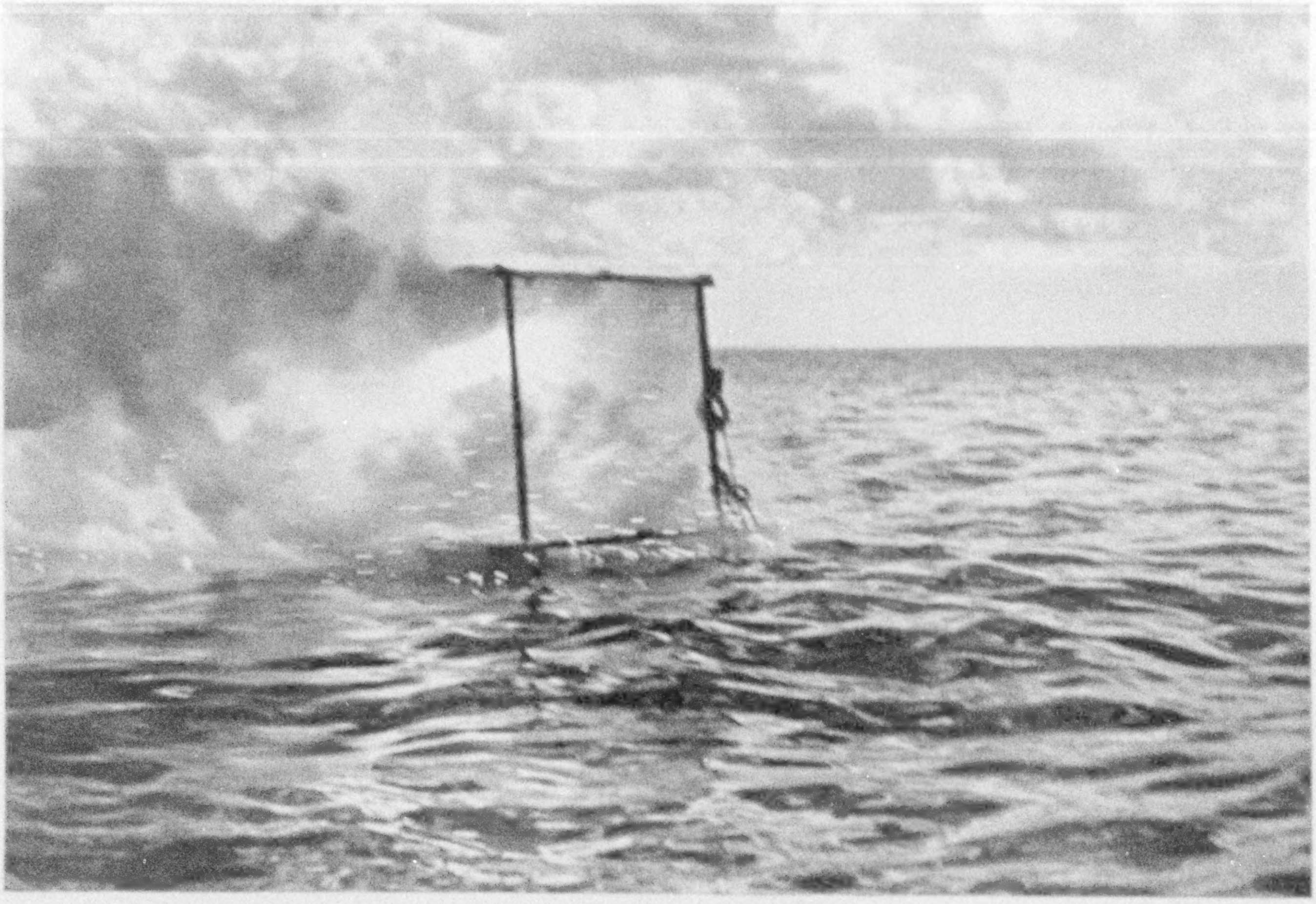
CASTLE BUILDERS OF THE SEA BOTTOM

When I mentioned our lack of knowledge of what goes on in ten feet of water, I was thinking not of what happens there occasionally, but of what occurs frequently—it may be almost continuously—over long periods. How happy chance sometimes lifts the veil for an instant is easily illustrated.

I have noticed for years coral fragments lying in patches a foot or more in diameter on some of the bare, gravelly bottoms my boat frequently crosses. They have been as great a mystery to me—yes, a greater mystery—than Stonehenge is to archeologists.

It was impossible that they should have arisen by chance, yet I could suggest no builder. But at last, only a few days ago, in glassy calm, shortly after noon, at full high tide, I passed over acres of bottom where from the launch I could see, instead of mere patches, regularly drawn circles in all stages of construction.

In places they were crowded like nests of flamingos in the Bahamas or of geese on their Arctic breeding grounds, and over scores of them I saw hovering, just above the bottom, each within or beside its stony



Photograph by Charles Martin

THE EXPLOSION OF ONE POUND OF FLASH-LIGHT POWDER OFF DRY TORTUGAS

See, also, illustration on page 73, text, page 56, and Color Plates XII to XV.

rampart, a single fish of a common species (see illustration, page 68).

At once I knew these puzzling structures, at least in part, for what they are. They are built by one of the razor fishes, deep and compressed creatures whose head from snout to nape is sharpened to so thin an edge that they dive readily out of sight beneath the sand. They hide there at night, like the other labroid fishes, and commonly lurk there during the day.

I occasionally come upon one which has dived under, and then turned and come out until head and gills are free. I have followed many a one swimming over the sand and in its haste tilted on its broad side like a boat careening in a gale of wind.

I have long strongly suspected that they return to the same spot habitually to hide, but I did not know that they fence their retreats and maintain property rights in them.

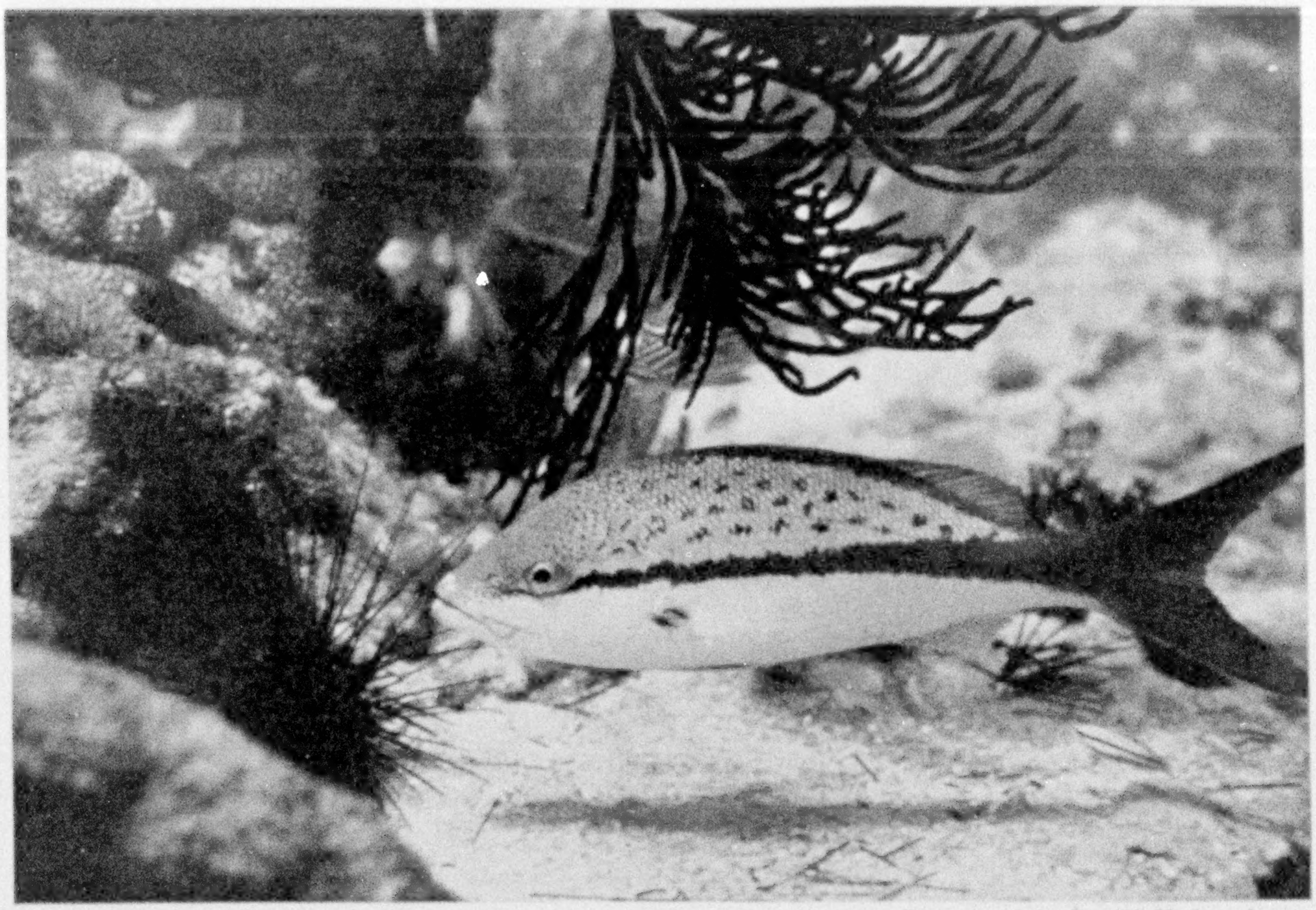
They are keen, I find, to keep their piles in order. Every stone I topple into the crater is promptly drawn out and put in place again, which is, after all, not surprising, for the material a single fish gathers may fill an ordinary pail and include as many as a thousand pieces. The capital investment is too great to be abandoned lightly.

Usually Fortune requires much more coaxing before she responds so generously. To humor her and catch her suggestion for new studies, I go where fishes throng.

There is a great coral patch far up Loggerhead Shoal which I often visit. It is U-shaped and lies in about twelve feet of water. I prefer to come to anchor in its open bight and work out through it from the inside. My purely practical reason for so doing is that I can cover a greater part of it in that way than in any other; but, in addition, I confess that under water, two miles from land, I am no lover of "the great open spaces." With less justification than the razor fishes, no doubt, I enjoy my bit of an inclosure almost as much as they.

HUMAN ASPECTS OF SEA LIFE

On the rather bare bottom, in my protected anchorage, I find, if I care to stay, many interesting things. After a little the



Photograph by Dr. W. H. Longley

A GRACEFUL YELLOWTAIL COMES TO FEED ON A SEA URCHIN BENEATH A SPREADING GORGONIAN

It has three times pricked itself on the urchin's spines. A yellow grunt is partly hidden in the "shrubbery," which is not a plant, but as much animal as the fishes themselves.

beady-eyed *Gnathypops aurifrons* raises its yellow face here and there from the mouth of its burrow, and then, if nothing further happens to disturb it, its pearly blue-gray body follows, until it has resumed its usual feeding position, a foot or more above the bottom.

Here and there, too, in other burrows roundabout, which they scarcely leave by day, I soon see other kinds of Gnathypops, whose mottled colors are as appropriate to the bottom as the delicate water color of the other is to its higher station.

These rest in their vertical stone-lined burrows like tiny marmots, and are seen first when they turn to cast an inquisitive and wary eye to a new point of the compass or when, after a trip to the foot of their deep shafts, they come up and spurt out a mouthful of loose sand.

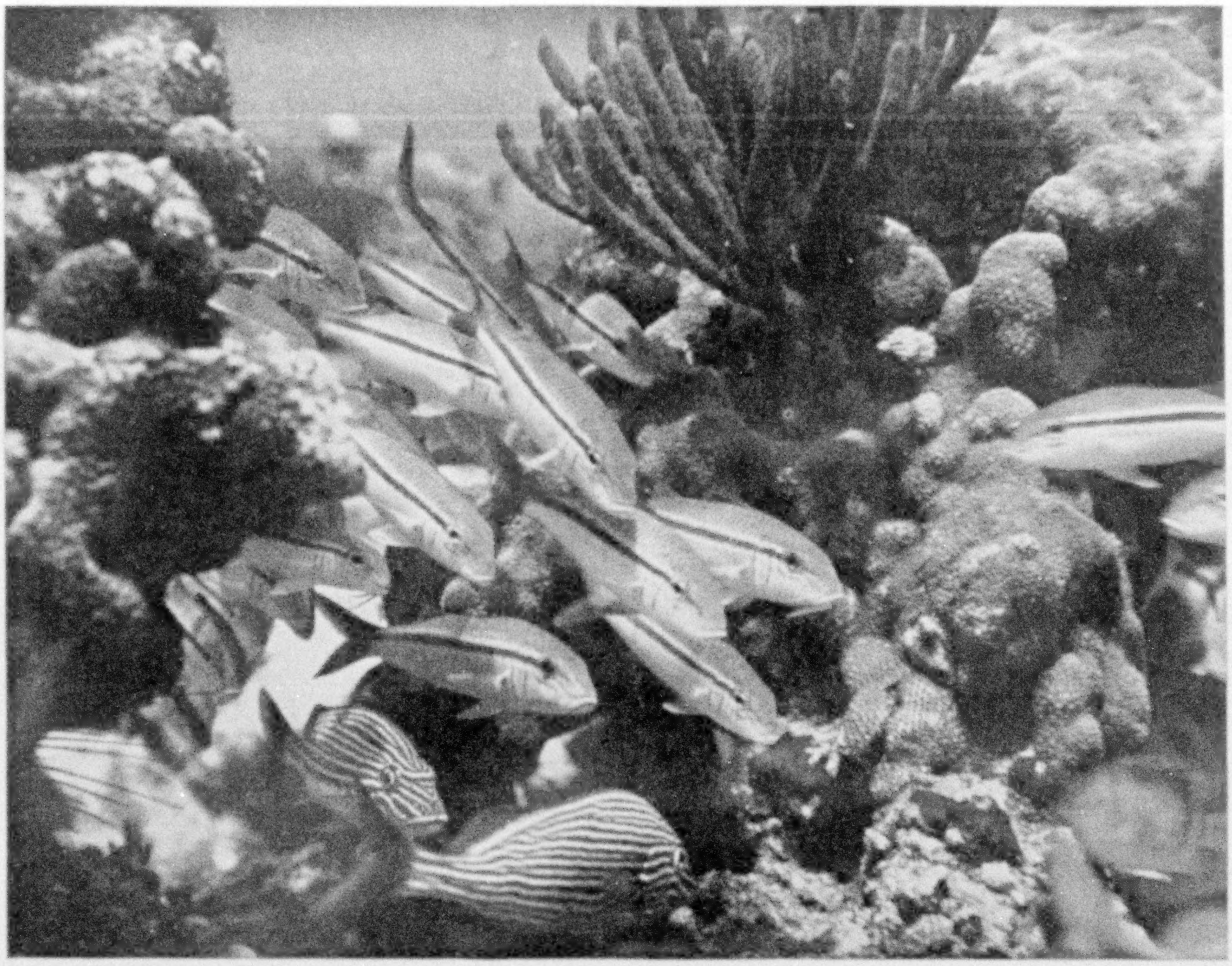
They build much more ingeniously than the razor fishes and, by day at least, stay much more at home. When the larger sorts go within for a long time, they often close the door behind them by drawing in a piece of dead coral large enough to block the entry.

They commonly live alone; but, in spite of the fact that their days are largely spent in upward gazing, they know where one another's holes are. In case their own shelters are destroyed, they often go as directly as I can to another, it may be yards away, where they are usually very coldly welcomed.

THE TRUNKFISH WASHES ITS FOOD

Where the Gnathypops villages are I may find the shellfish, or trunkfish (see page 80), whose whole body, by the fusion of thin hexagonal plates in the skin, is inclosed in inflexible armor. Only the jaws, eyes, fins, and tail are movable. It is a very good arrangement, I have no doubt, but it obliges the fish to stand on its head to feed from the bottom.

It goes round in this strange pose, directing a strong water current through its tubular snout and thus blowing its food



Photograph by Dr. W. H. Longley

YELLOW GOATFISHES PEERING THROUGH CHINKS IN THE CORALS AND POURING OUT THROUGH GAPS BETWEEN THEM

Two in the foreground show the pair of barbels beneath the chin to which they owe their name. The all-but-ubiquitous yellow grunts are represented by several specimens. A gorgonian tops the coral reef.

free from dust. It is accompanied usually by a band of small fishes, which prey upon the things the larger uncovers.

To this bottom also the great hogfishes may come for sea urchins which I break for them, and snout to snout push one another with jaws of six-inch gape (see Color Plate XII).

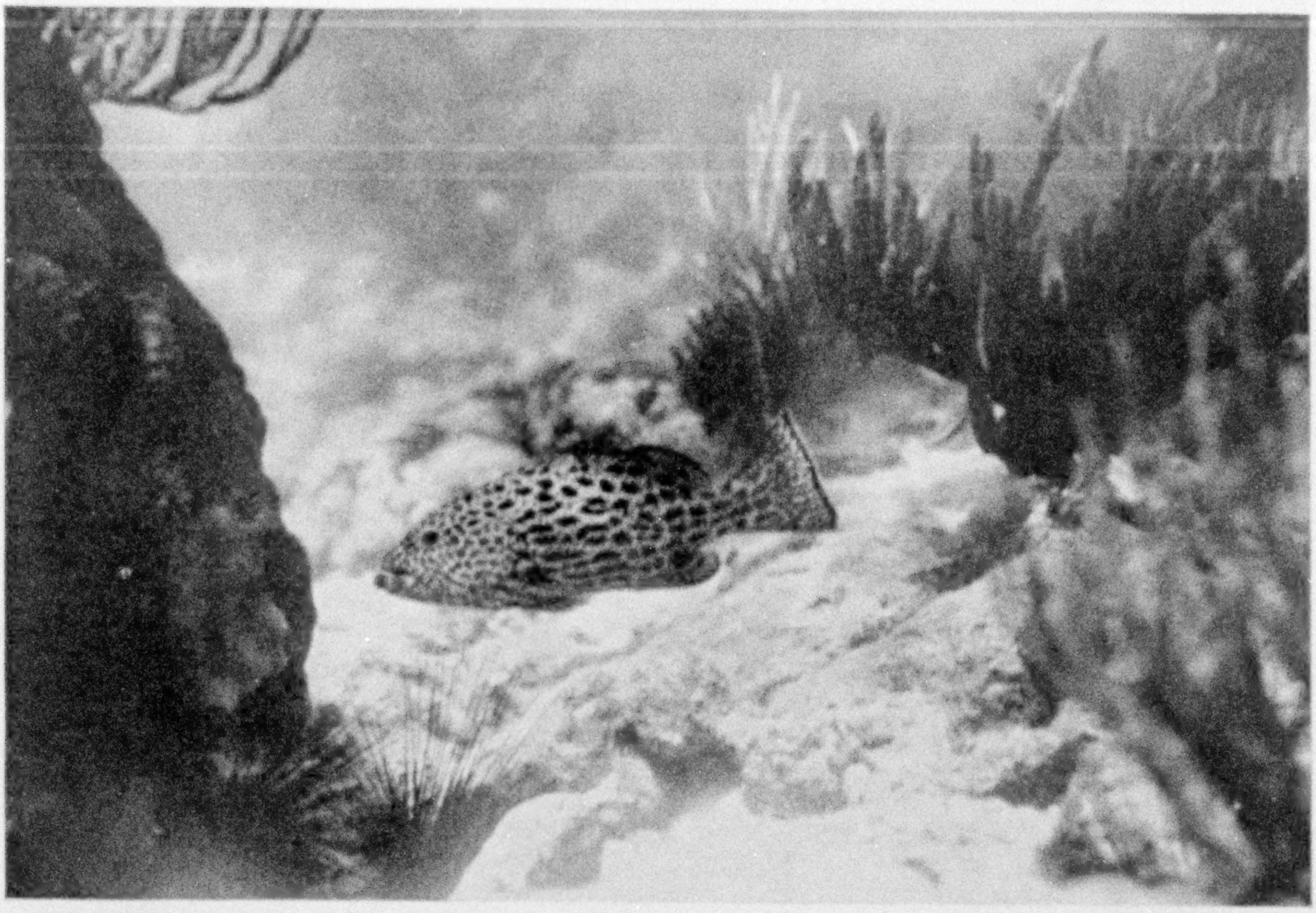
As I go up toward the coral patch, I find the larger Orbicellas standing a foot or two higher than I, like great brown or yellow-olive bowlders.

THE BEAUTIFUL WAVING GORGONIANS ARE ANIMALS

There is little about them, and about the gorgonians that add so much to the beauty of the submarine landscape at Tortugas, to proclaim their animal nature. Yet all are animals and, since they make the reef in the first place and determine largely the conditions under which all the other creatures live, none are more justly entitled to consideration here (see Color Plates XII, XIII, and XV).

Both corals and gorgonians are related to sea anemones. So like microscopic anemones are young corals, indeed, that to one who has seen them grow from the egg, adults seem little more than anemones modified in two significant respects. They have developed skeletons, which the anemones lack, and by budding, without separation of parent and bud, have become compound.

Between themselves and the bottom on which they stand, corals deposit, particle by particle, brittle limestone; gorgonians, flexible horny material. This seat, whose substance is always wholly outside their bodies—as much external as the sandals in which a man stands—is variously changed in shape as they grow. It gives form alike to branches or massive corals,



Photograph by Dr. W. H. Longley

A YELLOW-FINNED GROUPER (*Mycteroperca venenosa*) PASSING FROM THE SHELTER OF ONE CORAL HEAD TO ANOTHER

Corals, gorgonians, sea urchins, and eroded skeletons of dead corals constitute a typical reef scene in the relatively open spaces (see text, page 76).

to coarse or finely divided and feathery gorgonians, or to the spreading sea fans.

Through the life of thirty or more generations of men, it grows beneath the greater and longer-lived coral colonies, which may rise, perhaps, to twice a tall man's height and spread even more broadly.

CORALS RAISE THEIR OWN PLANT FOOD

Imbedded in the deeper layers of cells of which the translucent substance of their bodies is composed, there are in corals myriads of microscopic plants, green or yellow, or of the other colors corals display. It is their pigment, shimmering through the living tissue thinly covering the skeleton, that gives the coral its apparent color.

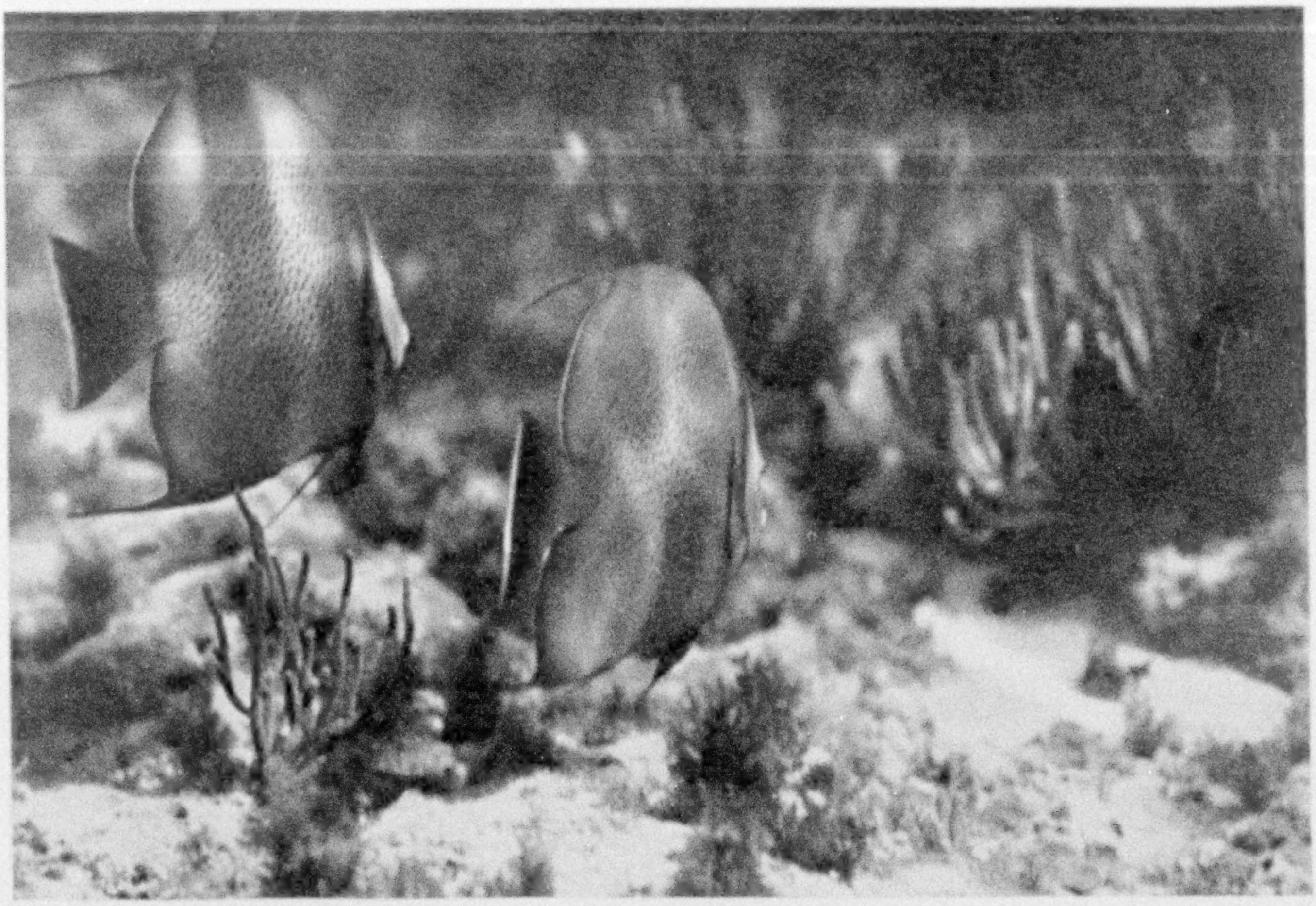
Until recently, these plants were supposed to be merely cotenants with the coral of its fleshly tabernacle, as little helpful as harmful; but latest research seems to show quite another relation.

The coral lodges the plants—feeds and devours them—obtaining, it seems, no small part of its nourishment from them. Some ants in their nests cultivate fungus gardens on which they feed. The corals go them one better; they raise their plant food within their own bodies. Polyphemus herded his prospective victims in a close-barred cave; yet the wily Ulysses evaded him. Here, postponement of the inevitable seems the most that may be hoped for the imprisoned algæ.

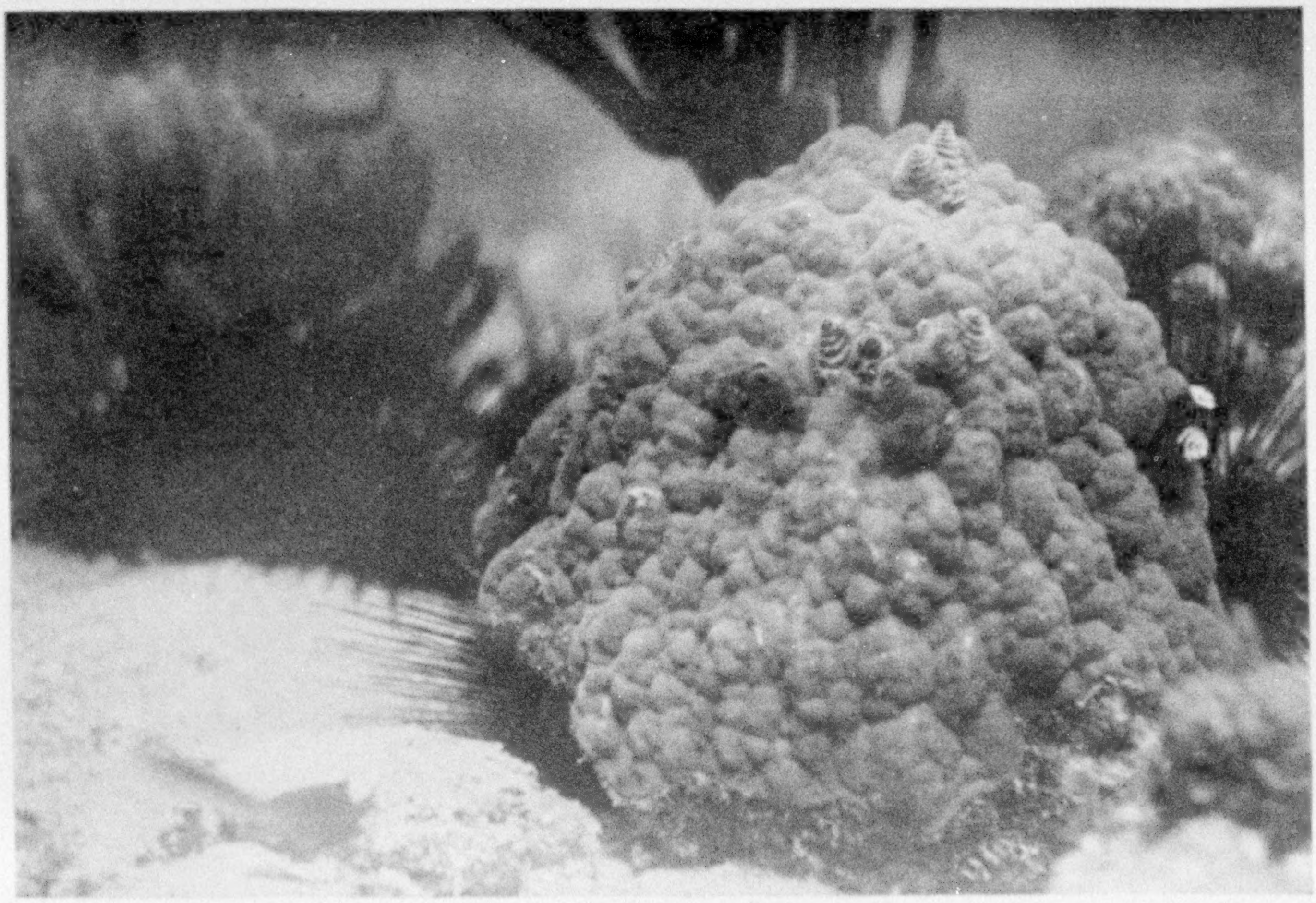
I go up into the coral patch through a narrow cleft in a huge head which seems to have been split asunder, although actually the rift may be between twin heads whose opposed faces have been eroded by the combined attack of boring organisms and chemical solution.

This portal opens upon a tortuous canyon, pockets in whose rough bottom shelter the ubiquitous long-spined sea urchins which also hang upon its vertical walls.

On the walls, too, or in the wall, are incrusting sponges, ascidians or Bryozoa, hydroids hanging in delicate sprays, delicate and highly colored flowerlike heads of tubicolous worms, tawny hydrocoral-



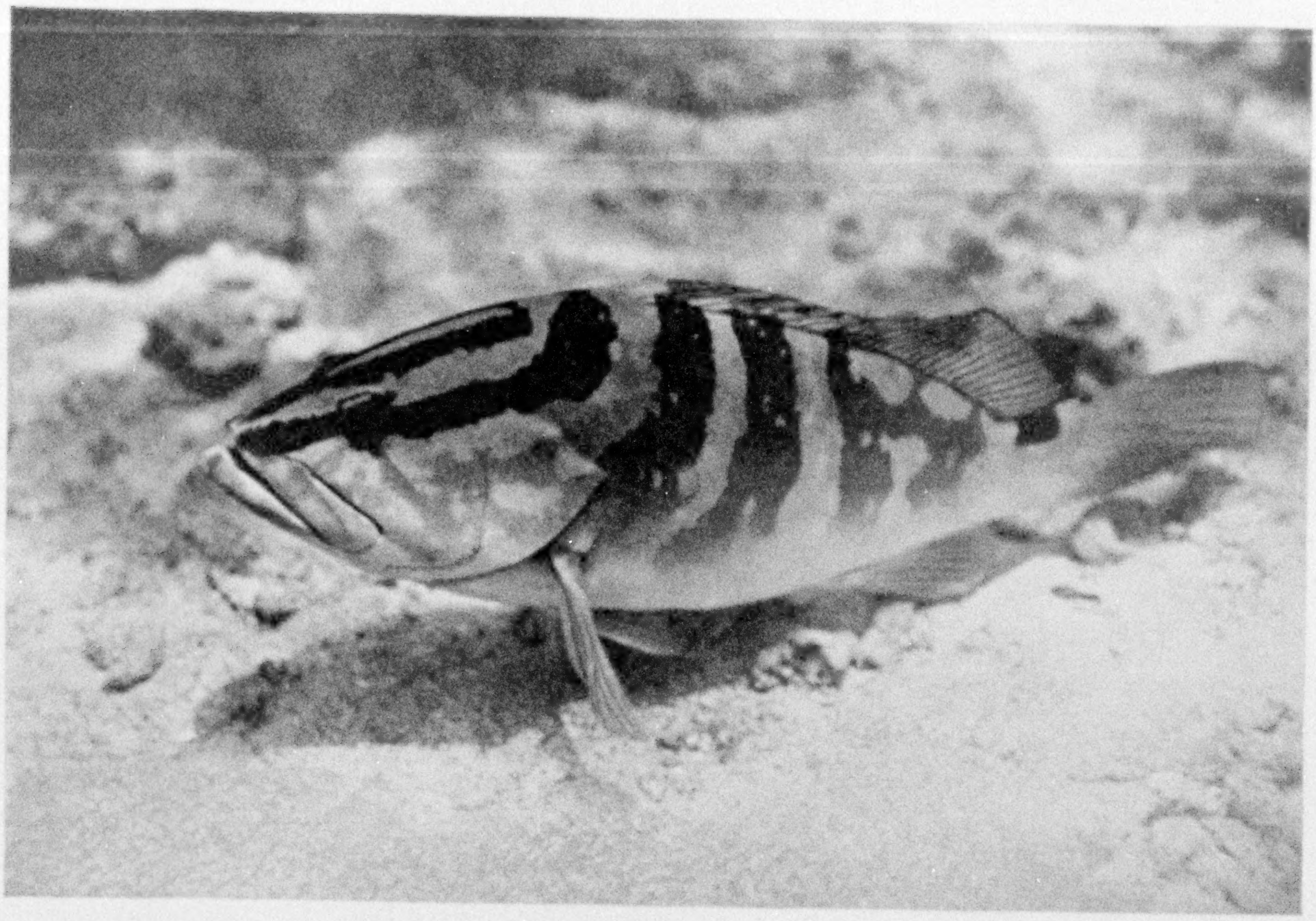
BLACK ANGEL FISHES (*Pomacanthus arcuatus*) SWIMMING TOGETHER ON THE OPEN REEF



Photographs by Dr. W. H. Longley

TUFTED HEADS OF WORMS PROTRUDING FROM A SMALL CORAL

The worms are variegated, the coral often brilliant yellow, and the sea where this kind of life is found is gay with color. Long-spined sea urchins abound in the crevices of the reef rock, as well as in the open spaces.



Photograph by Dr. W. H. Longley

NASSAU GROUPER (*Epinephelus striatus*), ONE OF THE SEA BASSES

This is a shapely representative of one of the most important families of food fishes.

lines in broad patches, and films of algæ spreading like green stains upon gray surfaces.

Round holes of various sizes made by boring clams harbor fishes and shrimps I find in possession after the death of their makers.

Fishes by hundreds are often here within a few paces of my position, swimming above me or peering out from their hiding places; fishes by thousands are within the radius of my hundred-foot hose. I can at any time find specimens here of any one of fifty species I choose, but in many respects I enjoy the tiny ones most. Perhaps it is because I see, or think I see, more of their world and understand their relation to it better than I do that of the larger, stronger ones, which range more widely.

IN THE HAUNT OF THE OPOSSUM SHRIMP

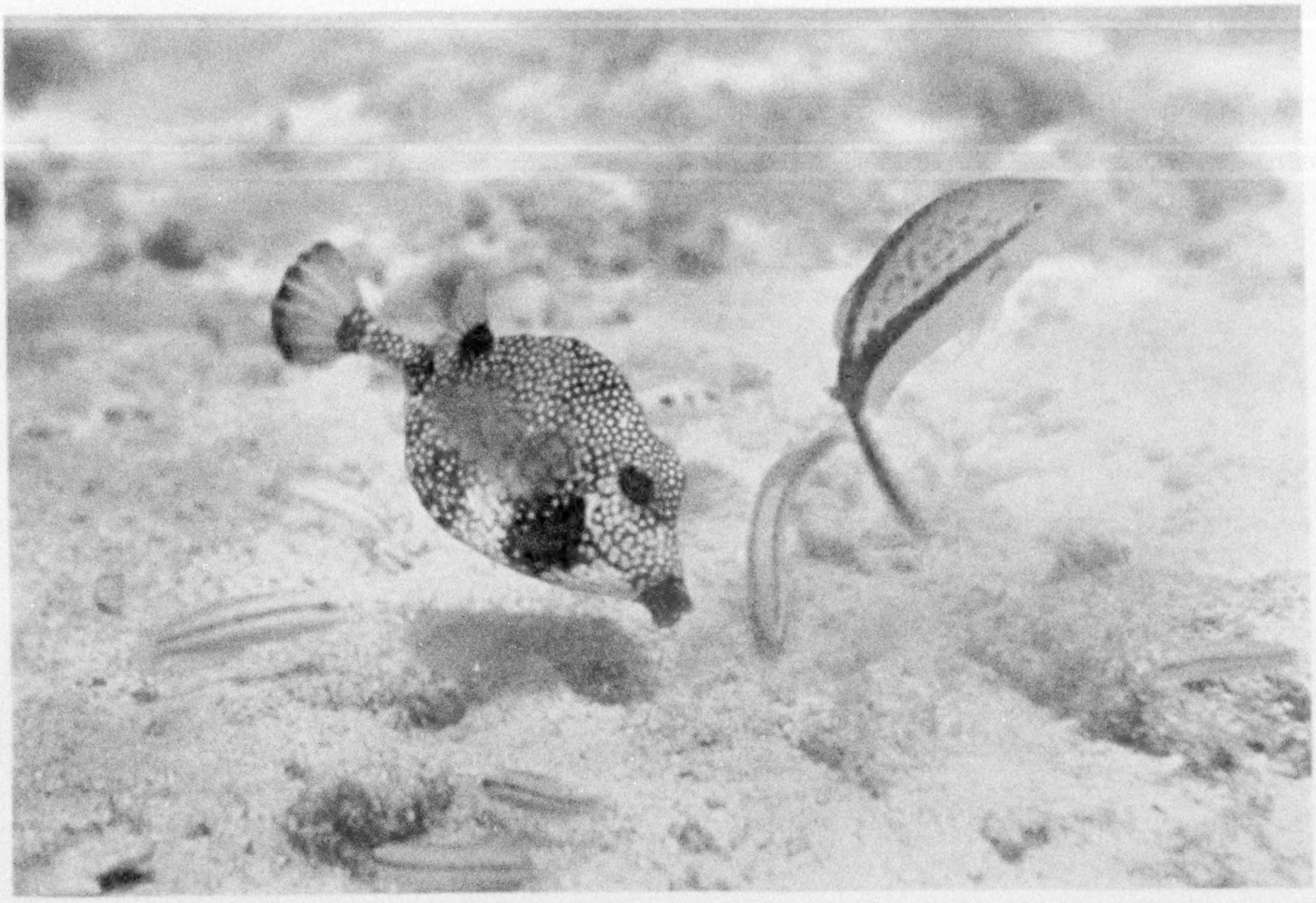
Here I have seen much and hope to see more. Here swims Mysis, the opossum shrimp. Long I took their tiny, tapering, pellucid bodies and round black eyes for those of the smallest fish embryos. They teach me how the sea population maintains its numbers despite its constant depletion through continuous slaughter.

With the sweep of a tow-net through their swarm, I trap a thousand. On their lower side, between thorax and abdomen, I find the females bearing a broad brood-pouch formed of arched leaflike growths from the bases of two adjacent legs on either side.

These delicate membranes are bordered at their free margins by a row of stiff hairs turned toward and thrust between those of the corresponding series of the opposite side. They are like interlocking fingers or the stiff hairs that shut insects within the closed leaves of the Venus flytrap. Here they close the exit for developing eggs in the pouch, but stand ready to be forced by the developed larvæ when the time arrives for them to shift for themselves.

Of these larvæ I find, perhaps, three awaiting liberation, but often as many as seven eggs together.

Here I find commonly several species of fishes known elsewhere than at Tortu-



Photograph by Dr. W. H. Longley

A TRUNKFISH (*Lactophrys triqueter*) ABOUT TO BLOW SAND AWAY FROM ITS FEEDING PLACE

Six small slippery dicks (*Halichœres bivittatus*) accompany it. Such attendants usually follow the actively feeding trunkfish. A yellowtail is turning away. It, too, is attracted by the probability of capturing something uncovered by the trunkfish. A red goatfish stirring up the sand with its barbels is in the background.

gas from no more than three or four specimens. One lurks under the sharp-spined black sea urchin, and a safer place could scarcely be discovered. Another lives by preference under the overhanging margin of living coral, above such dead faces as surround me in this cleft. It moves about, upside down, under the coral eaves as easily as the fly walks on the ceiling. Just how it does this I have not yet made out.

Its fins are under its throat and it often stands upon them with its trunk parallel with the rock face, but not touching it. Sometimes it stands so and swings its tail from side to side. Two, even—perhaps by chance only—facing one another did the same, giving an absurd and probably false picture of swelling anger.

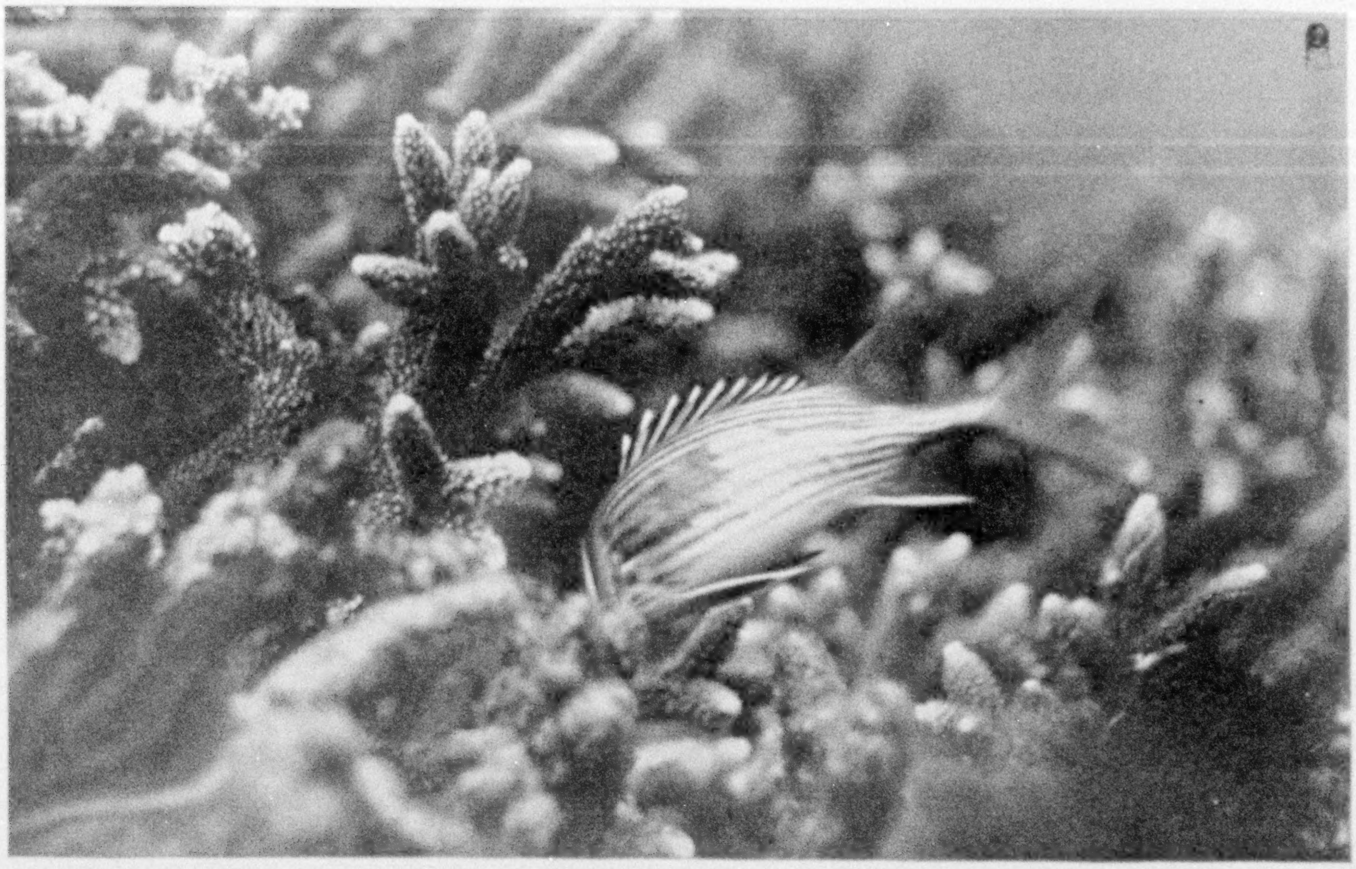
It was here I found, fixed by one valve to the roof of a small cavern, the gaping shell of a mollusk which attaches itself to solid objects much as an oyster does. The soft tissues of the animal were gone, but the hinge still held in place the lower valve, whose cup offered and still offers an ideal shelter for fishes with the instinct to use it.

HINTS OF A HOUSING SHORTAGE IN THE FISH WORLD

When I first found the shell I took from it a small blenny; within a day or two another, and a little later a third of the same kind had installed itself.

This, like so many other of the facts I record, is in itself a trifling observation. But, as has been well said, one may look through a small window into a very large world. Do these notes not suggest that in this particular coral patch there exists something in the nature of a housing shortage?

And does not the fact that, in spite of apparent crowding, only one species availed itself of this particular resting place speak eloquently of the different relation in which creatures of the same



Photograph by Dr. W. H. Longley

SQUIRREL FISH (*Holocentrus ascensionis*), ONE OF THE NOCTURNAL SWIMMERS

This species hides in the reef by day. After momentary excursions into the open it darts into the shelter of a patch of staghorn coral. Such stony thickets harbor a large population of nocturnal creatures (see, also, text, page 70).

general sort living together stand to their common environment?

It is only through ignorance that we are able to speak of any two as having precisely the same habits.

The more I see of the reef animals the more I marvel at the nicety of their adjustment to the lives they lead, and the more fascinating becomes the quest for light upon their habits.

I find, for example, in the stomachs of tiny fishes the broken bodies of small Crustacea I have never seen alive, and the pieces of their limbs I pick out have all the individuality of tools designed for single and delicate operations.

Nothing in watchmaker or surgeon's kit speaks more eloquently of adaptation to particular ends; yet those ends in this instance remain all unknown.

THE VENEER OF COMPROMISE IN ANIMAL WORLD MISLEADS INVESTIGATORS

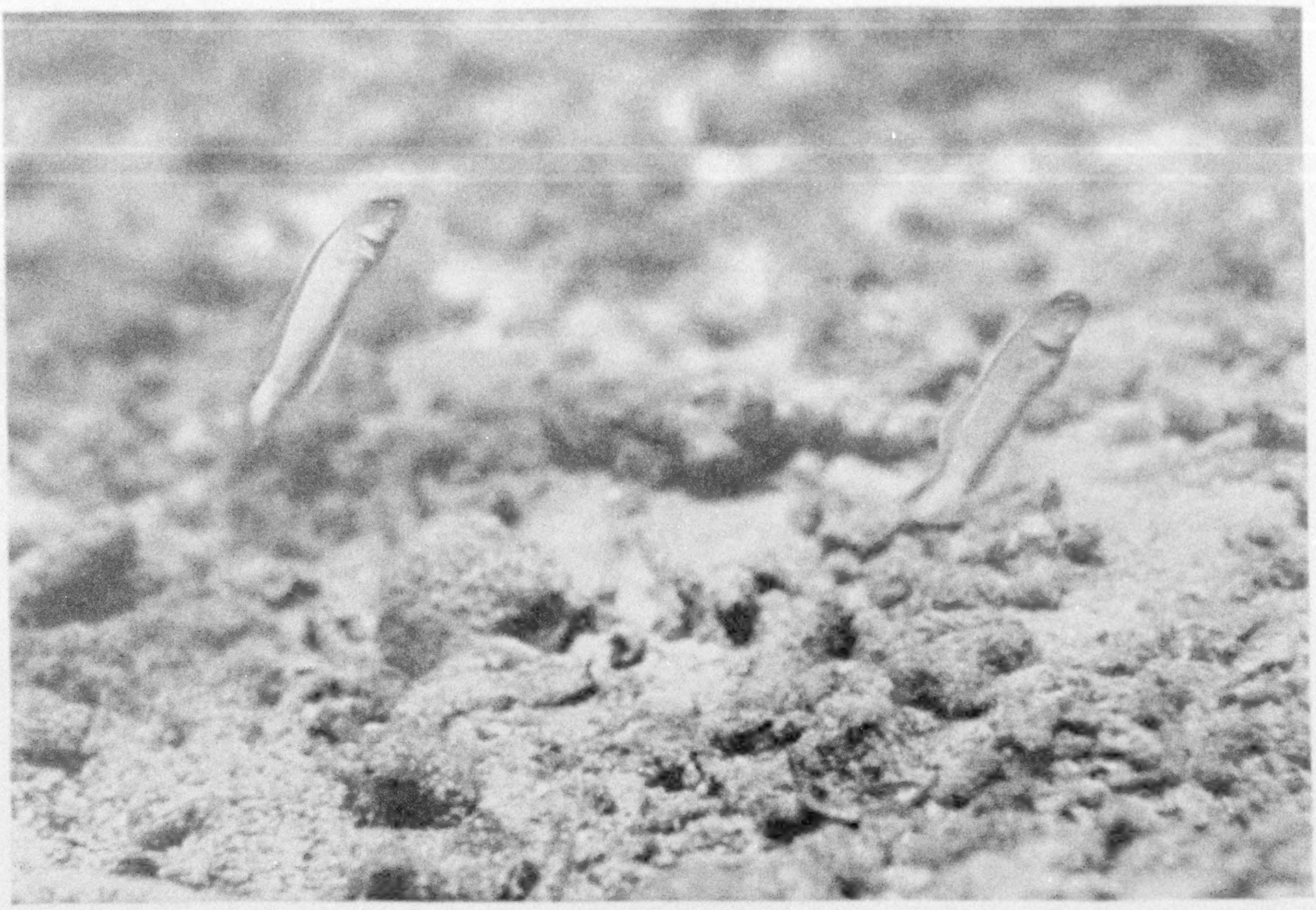
Biologists for the most part underestimate, I think, the degree to which adaptation to environment occurs among animals. Trained in the refinements of laboratory technique, often knowing little of animals under natural conditions, they overlook many of their peculiarities which are most instructive. Even with the advantage of studying them in the field, it is no easy matter to grasp the significance of detail in their structure.

We see the obvious sometimes; we discover more obscure things occasionally by happy chance; and the hidden things we bring to light rarely, and then only by extensive comparative studies.

Adaptation is more easily comprehended when it involves adjustment to single or simple conditions. It is perceived with greatest difficulty when adaptive structures fit the average conditions under which a wide-ranging creature lives.

It is sometimes so evident in the first case that the animal does not need to be in its natural surroundings to betray its fitness. In the second, the fact of adaptation is often concealed largely by the veneer of compromise.

I remember picking up, on one of my submarine rambles, a snail that had cemented to the lip of its shell, as it grew, bits of dead coral and shell from the bot-



Photograph by Dr. W. H. Longley

TWO SPECIMENS OF GOLD-BROWED GNATHYPOPS (*Gnathypops aurifrons*)

The shaft retreats of this fish are built in gravelly bottoms (see text, pages 74-75). These specimens are feeding, but on the least alarm will retreat, tail foremost, into their burrows.

tom. It was, when complete, a marvel of disguise. Whether because of its rarity or the effectiveness of its concealment, I have never found another.

No one needs instruction regarding the effect of such artificial aids to inconspicuousness on bottoms they cover by acres. A laboratory specimen would tell the tale almost as effectively as one in the open.

SCORPÆNA WEARS TATTERS FOR A DISGUISE

Among fishes, those that haunt by preference a particular type of bottom sometimes reveal the nature of their dwelling place as clearly as the disguised snail.

Scorpæna, with its tatters of dermal filaments hanging about its lips and from the spines and ridges of its large and rugged head, or from fin spines and sides of the body, is a miracle of disguising coloration, as it lies still upon an alga-covered bottom, making no move for hours, except the inconspicuous opening and closing of its opercular cleft to control the water stream bathing its gills.

I saw one a day or two ago and had fairly to rub its back before I could convince myself that it was not actually overgrown by the film of algæ its color imitated. Even in a cement tank the meaning of its decoration would be clear.

One might imagine the hours of quiet it spends, unbroken, as I have seen, even when a hermit crab drags its shell across the fish's outspread fins. Imagine, as I have seen, also, the impetuous, engulfing rush with which at last it seizes unwary small fishes that have, perhaps, accepted it as a part of its surroundings.

THE LITTLE TUNNY STOWS ITS FINS IN GROOVES

Not less obviously shaped and colored adaptively is the little tunny (*Gymnosarda alleterata*), not greatly different, except in size, from the tuna, well known to all devotees of rod and reel. Its shapely body is in every line designed for speed, and no detail is omitted that tends to preserve the perfection of its streamlines.

The high dorsal fin folds smoothly down in a deep groove in the back, a device common enough. But, most unusually, pectorals and ventrals at rest also fit perfectly into depressions in the smooth surface countersunk to receive them. The hand might be passed back over them without the sense of touch discovering them, so precise is the workmanship.

In the matter of color, similar perfection in detail is manifest. When the pectoral fin is fully extended it stands horizontally out at right angles to the body.

The ventrals similarly extended are spread in the same horizontal plane, and the upper surfaces of all are dark like the back; but the lower surface of the extended pectoral is glistening silver, and that of the ventral fin pure lusterless white.

As a result, when they are appressed to the body they not only sink into the depressions waiting to receive them, but the one pair is lost in the metallic silver of the side and the other in the flat white of the belly, with which they agree precisely in their respective positions.

By contrast, had I not had the good fortune to see them using their odd equipment, I should never have known why a large mantis shrimp at Tortugas has the last joint of its walking legs studded with bristles until they look like bottle brushes, or why the little crab Petrolisthes has on each joint of its last limbs, serving as jaws, a great tuft of fringed hairs.

I flexed and extended the maxillipeds of Petrolisthes, spread out the hair tufts that readily opened; yet the essence of their function escaped me before, in a fissure facing the tide, I saw the creatures throw these organs wide to form a great hemispherical funnel that caught drifting microscopic material until inturned, cleaned, and held forth again for Nature's bounty.

And I venture to say regarding the shrimp that no mere anatomical study, however thorough, would ever induce in the mind's eye a clear image of the animal standing in its burrow in incoherent sand, with its several pairs of flattened palms, its crooked elbows, and ten bushy feet bearing against the walls and keeping them from collapsing.

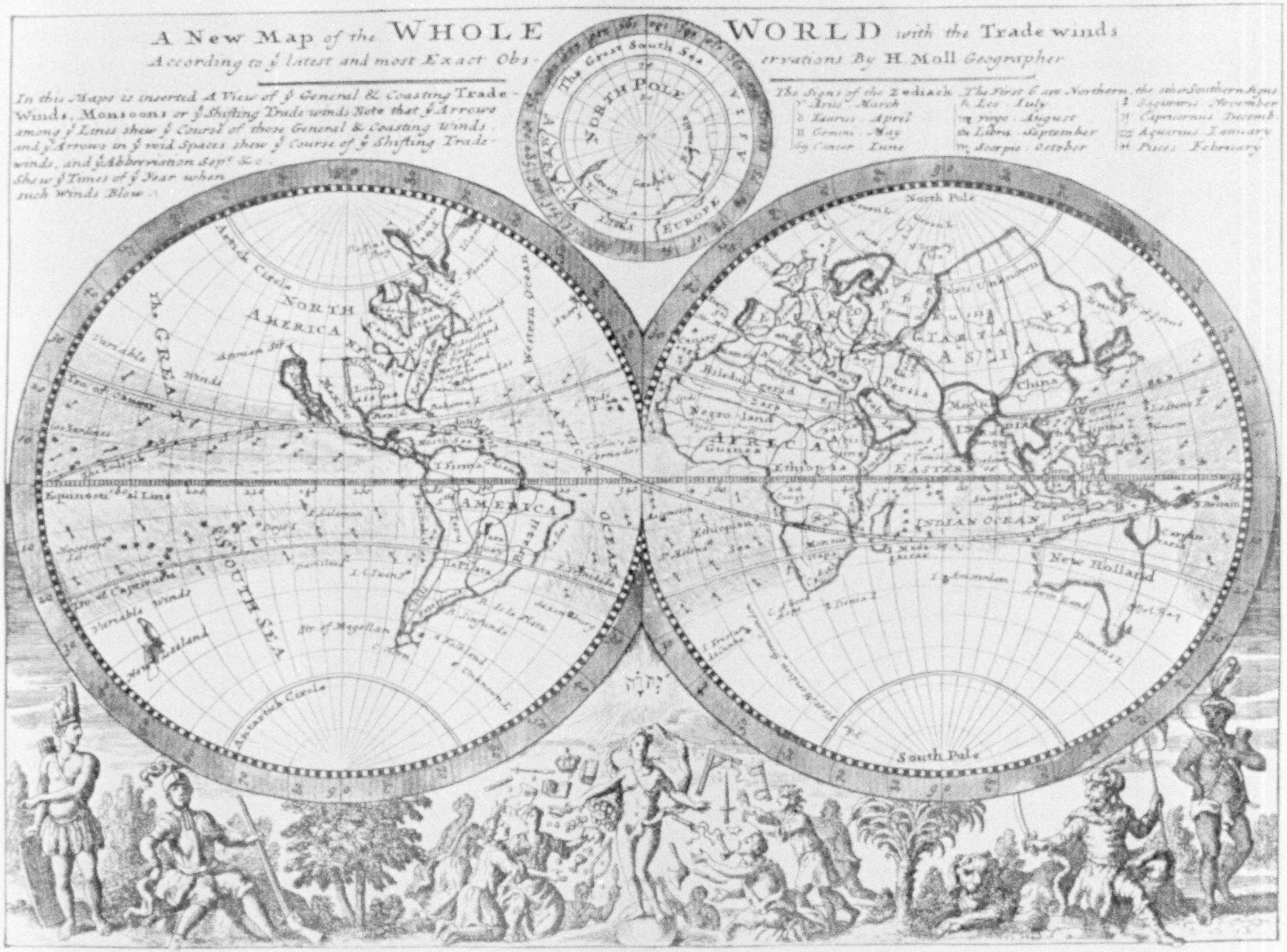
FIELD STUDY ALONE CAN SOLVE MANY RIDDLES

Here the difficulty in conceiving the service rendered by elaborate structures is due solely to that in visualizing the conditions under which they function, though these themselves, when discovered, may prove rather simple.

But where the element of compromise, to which I have referred earlier (see text, page 81), enters as it frequently does in the realm of coloration, field study—and then more field study—is absolutely necessary before the often marvelously effective disguises may be apprehended in their true relations.

On a ground color that matches one background against which it is commonly seen, bars appear, matching another entirely different. Contrastive patterns in gay colors result, which seem impossible to explain as useful; but to the enlightened eye these, no less than the more obviously serviceable structures described, illustrate that adaptation to environment which characterizes not only animals of the coral reefs, but which from the time of Aristotle has been recognized as a distinctive feature of living things.

Notice of change of address of your NATIONAL GEOGRAPHIC MAGAZINE *should be received in the office of the National Geographic Society by the first of the month to affect the following month's issue. For instance, if you desire the address changed for your March number, the Society should be notified of your new address not later than February first.*


A New Map of the WHOLE WORLD with the Trade winds
According to ye latest and most Exact Observations By H. Moll Geographer
In this Maps is inserted A View of ye General & Coasting Trade-Winds, Monsoons or ye Shifting Trade winds Note that ye Arrows among ye Lines shew ye Course of those General & Coasting Winds and ye Arrows in ye void Spaces shew ye Course of ye Shifting Trade-winds, and ye Abbreviation Sept. &c. Shew ye Times of ye Year when such Winds Blow
The Signs of the Zodiack The First 6 are Northern the other Southern Signs
♈ Aries March
♉ Taurus April
♊ Gemini May
♋ Cancer June
♌ Leo July
♍ Virgo August
♎ Libra September
♏ Scorpio October
♐ Sagittarius November
♑ Capricornus December
♒ Aquarius January
♓ Pisces February
The Great South Sea
NORTH POLE
ASIA
AMERICA
EUROPE
NORTH AMERICA
Arctick Circle
The GREAT SOUTH SEA
Western Ocean
ATLANTICK OCEAN
AMERICA
Equinoctial Line
Str. of Magellan
Antarctick Circle
New Zealand
North Pole
TARTARY
ASIA
China
Persia
INDIA
AFRICA
Negroland
Guinea
Ethiopia
EASTERN OCEAN
INDIAN OCEAN
New Holland
South Pole

THE WORLD AS DEPICTED BY MAP-MAKERS BEFORE CAPTAIN COOK'S FIRST VOYAGE TO "THE GREAT SOUTH SEA"

This chart, reproduced from Moll's Atlas, published in London about the time of Cook's first voyage, emphasizes especially how little was then known of the west coast of North America, a region which Cook explored on his third voyage (see, also, map, page 87).

THE COLUMBUS OF THE PACIFIC

Captain James Cook, Foremost British Navigator, Expanded the Great Sea to Correct Proportions and Won for Albion an Insular Empire by Peaceful Exploration and Scientific Study

By J. R. Hildebrand

Author of "The Geography of Games," "The Sources of Washington's Charm," "Man's Progress in Conquering the Air," etc., in the National Geographic Magazine

ONE can picture him coming up to Whitby—a tall, angular lad, his cheeks ruddy after his cross-country tramp in the sea air from Staithes. What would he do first—inflamed with this crazy idea of going to sea, so crazy that, failing to explain it satisfactorily to his employer, he ran away—what would he do, but go to the docks and mingle with the sailors?

What a town and what sights for a boy who had felt the call of the sea! Down a narrow street, evil-smelling, the landsman would say, between red-roofed, close-built houses, past ship chandlers with nets and blocks and tackle and sails, he trudged to the water front. There, riding at anchor, were the whalers and colliers and merchantmen; this one bound for Bremen with iron and stone; that one for Danzig, or maybe even St. Petersburg, with jet or alum; a third, the one with the stern sails, just in from Penzance.

The fishermen are lolling about, pipes in mouths, indolent and slouching, until midnight galvanizes them into action. Thereafter the raging storms of the German Ocean and its icy breath alternately bedevil and benumb them.

A HABERDASHER'S CLERK YEARNS FOR A SAILOR'S LIFE

The boy, wide-eyed, open-mouthed, pack still on shoulder, was a target for this loutish crew.

"Name, son?"

"James Cook, sir."

Then perhaps a hesitating inquiry about a berth on some ship, and counterquestions about age, experience, his people; why he wanted to sign up for such a dog's life, anyway.

He was 18. His father was a day laborer. Mistress Walker, at Marton, had taught him his letters. He had helped on the farm; then he had been a clerk in a grocery and haberdashery back at Staithes.

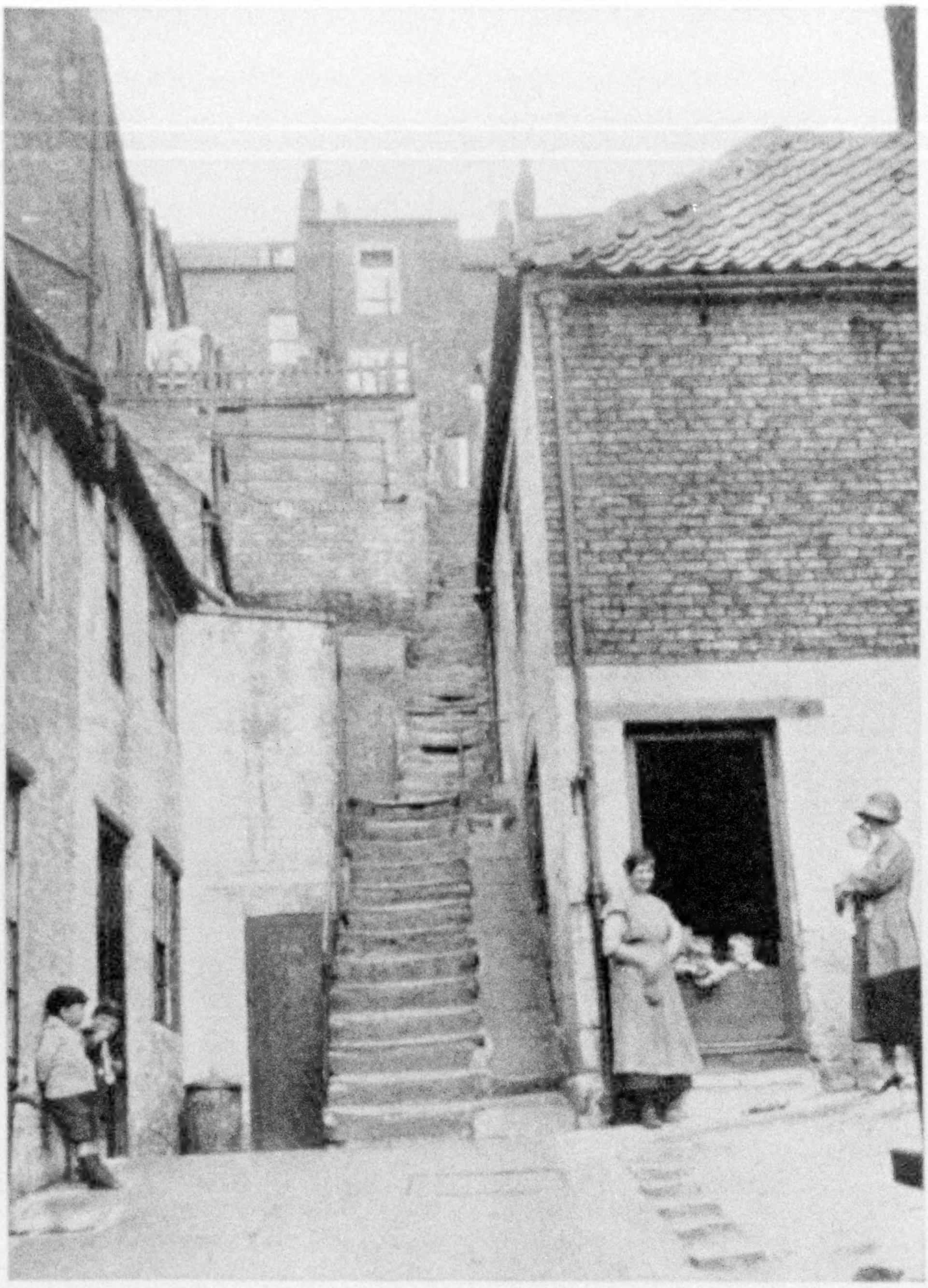
Of course they laughed—a hearty, derisive, deep-lunged roar. "He dug potatoes, and he sold ribbons and reefers and gingerbread, and he wants to ship aboard the first boat out! Well, I'll be—!" And so on.

NEW-WORLD DISCOVERY CULMINATES WITH COOK

Every boy yearns to see the world; but it is likely that no other boy has grown up to fulfill that yearning so completely as Captain James Cook, R. N., the circumnavigator.

School children study the conquests of Alexander and Napoleon, but they come upon surprisingly little about the bloodless, enduring victories of Magellan, Marco Polo, Vasco da Gama, and Cook. One widely discussed list of men who influenced the course of world history sent readers scurrying to reference books to identify Asoka, but omitted mention of Columbus.

If only for the strange, unheard-of things he saw—people who played flutes with their nostrils, curious birds of amazing colors, canoes as big as the vessel he commanded, savages who roasted dogs in crude fireless cookers, calendars that went by the moon, an animal that a sailor at first took for the devil (it was the first kangaroo seen by a white man)—these and other queer, new spectacles make Cook's voyages fascinating as narratives.



Photograph by J. R. Hildebrand

WHITBY, WHERE JAMES COOK FIRST SAILED AS A SHIP'S BOY

The quaint old town is famous for its seamen, its jet, and its staunch ships. It meanders along the ravine where the Esk River flows between tall cliffs into the North Sea, and its cross-streets, therefore, are, for the most part, stairways.

The epic voyages of New World discovery that began with Columbus culminated when Cook put Australia and New Zealand on the maps, took off the mythical southern continent, found numerous island oases in the hitherto single-track Pacific, sailed farthest north and farthest south up to his time, and extended the cruising radius of future navigators immeasurably by his conquest of scurvy.

Cook not only was a discoverer, he was truly an explorer in surveying and mapping what he found and observing what he saw. To that he added the third, and immortal, distinction of finding a way to conserve the health of sailors, and thus enabled his countrymen to travel again the paths he marked out.

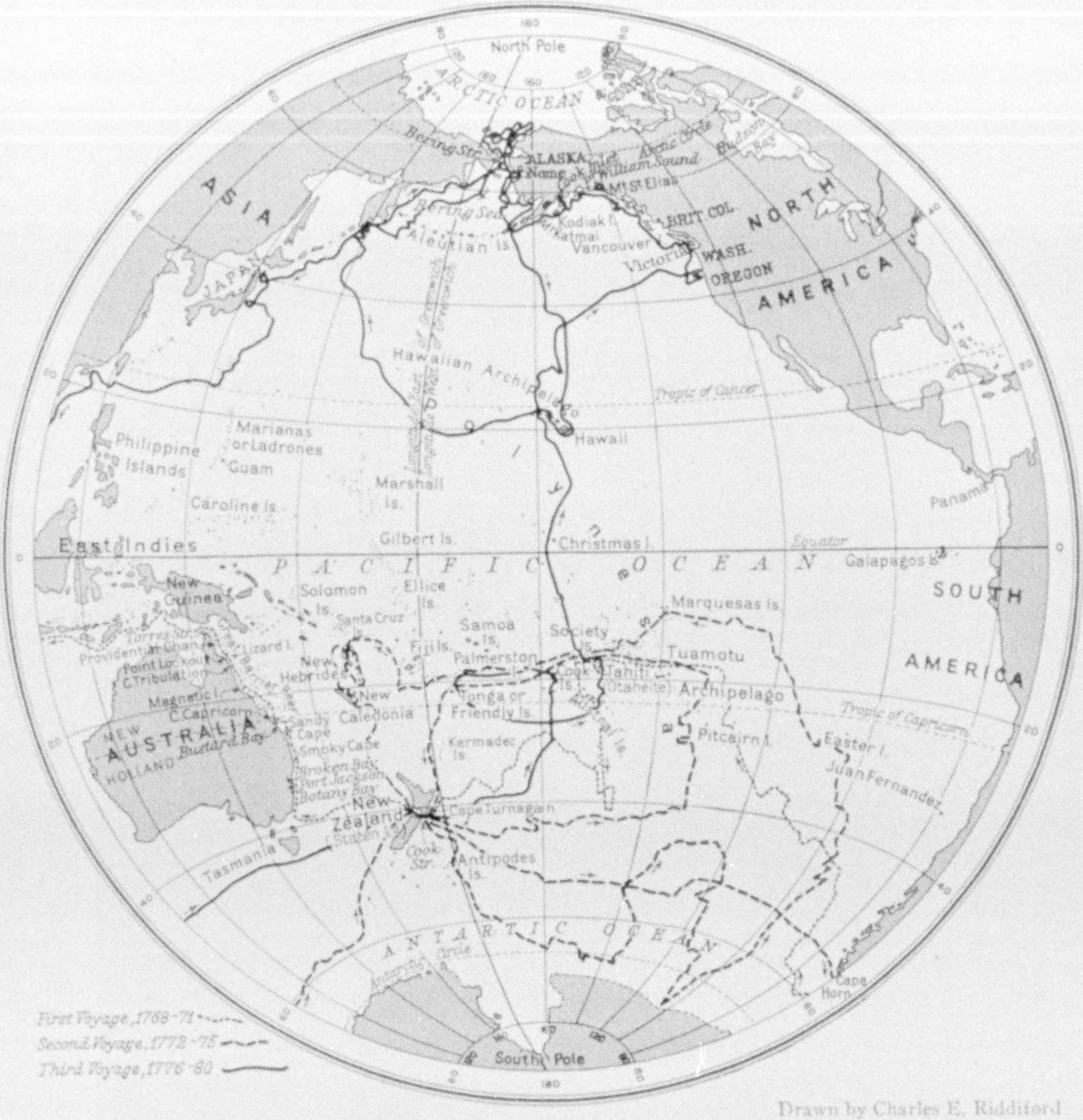
We, with New York within 34 hours of San Francisco by airplane mail, or within instant audible reach by a twist of a radio dial, find it hard to believe that Cook was opening up the Pacific many years after the Thirteen Colonies had been settled, and that this Englishman was nosing his way along the uncharted shores of what now are Oregon and Washington State and British Columbia and Alaska while the Colonies were fighting their War of Independence.

THE MAP OF THE PACIFIC REMADE

And we add another mite to our respect for the many-sided Benjamin Franklin, who, at the court of Louis XVI, suggested that our Revolutionary ally refrain from molesting Cook and other voyagers whose business on the high seas was concerned with exploration, not war.

A map of the Pacific in 1768, the year that Cook first set sail for the South Seas, showed very few of the numerous island groups we know, and much of what it did show was wrong (see pp. 84 and 87).

If it seems strange that only a century and a half ago most of the islands that dot the Pacific were unheard of in Europe, consider that this great water body covers about one-third the surface of the globe; its area is greater than all the continents combined; its width at the Equator is nearly half the earth's circumference and on one occasion Cook sailed for


North Pole
ARCTIC OCEAN
Bering Str.
ALASKA
Nome
Cook Inlet
Prince William Sound
Arctic Circle
Hudson Bay
Mt St Elias
Bering Sea
Kodiak I.
Mt Katmai
Aleutian Is.
Vancouver I.
Victoria
BRIT. COL.
WASH.
OREGON
NORTH AMERICA
ASIA
JAPAN
Hawaiian Archipelago
Tropic of Cancer
Hawaii
Marianas or Ladrones
Guam
Philippine Islands
Caroline Is.
Marshall Is.
Gilbert Is.
Christmas I.
East Indies
PACIFIC OCEAN
Equator
Galapagos Is.
Panama
SOUTH AMERICA
New Guinea
Solomon Is.
Ellice Is.
Santa Cruz Is.
Samoa Is.
Fiji Is.
Torres Str.
Providential Chan.
Lizard I.
Point Lookout
C. Tribulation
New Hebrides
New Caledonia
Palmerston
Society Is.
Cook Is.
Tahiti (Otaheite)
Tuamotu Archipelago
Marquesas Is.
Tonga or Friendly Is.
Austral Is.
Magnetic I.
C. Capricorn
Sandy Cape
Smoky Cape
NEW HOLLAND
AUSTRALIA
Bustard Bay
Broken Bay
Port Jackson
Botany Bay
Kermadec Is.
Pitcairn I.
Easter I.
Tropic of Capricorn
Juan Fernandez
New Zealand
Cape Turnagain
Cook Str.
Staten I.
Tasmania
Antipodes Is.
ANTARCTIC OCEAN
Antarctic Circle
Cape Horn
South Pole
First Voyage, 1768-71
Second Voyage, 1772-75
Third Voyage, 1776-80

Drawn by Charles E. Riddiford

THE ROUTES OF CAPTAIN COOK'S THREE VOYAGES THROUGH THE GREAT SOUTH SEA

Each of the famous English geographer's expeditions filled in blank places on the Pacific map or corrected gross errors of current atlas-making. On his first voyage he mapped the Society Islands, showed New Zealand to be two islands, and "amputated" Australia, which hitherto was considered a peninsula of New Guinea. On his second voyage he circumnavigated the Southern Hemisphere between the 40th and 67th parallels, dipping nearer the South Pole than any previous navigator, and explored New Caledonia and South Georgia. The important result of this voyage was the elimination of the great southern continent geographers believed projected northward between Africa and South America. Cook reported, however, that he thought a land body existed in the region of the South Pole. On his third voyage Cook discovered the archipelago named for him, explored the Hawaiian group, and mapped the western shores of North America from what now is Oregon to northernmost Alaska. He cruised in the Bering Sea and reported the existence of the Aleutians. Returning from these discoveries, he met his death in Hawaii.

117 days without sighting land. Small wonder that the Spaniards in crossing it hugged the parallel of 13° north as they would have clung to a life line, thus insuring their touching the Ladrones on their 80-day voyage to the Philippines.

Headlands all over the Pacific are the headlines of Cook's geographical explorations.

COOK OBTAINS "BOOK LEARNING" BETWEEN VOYAGES

Cook's private life is almost as blank as Shakespeare's. At Whitby he had

Photograph from C. W. Wright

FUNCHAL, MADEIRA ISLANDS, WHERE COOK PROVISIONED HIS SHIPS

In beginning his first voyage Cook foresaw that his cruising radius depended on the health of his crew, especially in the prevention of scurvy. He had confidence in the value of onions as an antiscorbutic, so he purchased generous quantities of this vegetable at Funchal and served them regularly as long as the supply lasted, much to the disgust of his crew.

promptly apprenticed himself and soon set sail in the *Free Love*, a coastal collier. References in his later narratives show that he visited Norway and probably Russia, but not Greenland. And that is about all that is known of his thirteen years in the merchant service.

Some things are easy to infer, however. Fighting gales, eating bad food, living in cramped quarters, enduring bitter cold were the common lot of North Sea sailors, and that experience taught Cook the disregard for hardships which marked his future life.

He must have been a personable young man; all through his career some one is stepping forward in his behalf.

He was singularly modest. Not only is his personal correspondence practically nil, but his own accounts of his voyages are defective in one respect. They abound in the most minute and interesting observations of what he saw; they are matter-of-fact and commonplace in telling what he did. One must read other narratives than his for anecdotes of narrow escapes and personal daring.

Cook's life story was as rare in his day in England as it is familiar in America to-day—the story of a self-taught man, whose schooling was negligible. His "book learning" he gained between voyages. While at Whitby he begged a table and a lamp from his employer's housekeeper; years later, when compelled to winter at Halifax, he first encountered Euclid. The ways of genius are inscrutable, so why waste time speculating how Cook learned navigation, mathematics and astronomy?

EXPLORER'S REAL CAREER BEGAN IN NORTH AMERICA

At the outbreak of war between England and France in 1756, Seaman Cook emerges from his sailor obscurity, volunteers in His Majesty's Service, and gets a berth with the fleet supporting General Wolfe's siege at Quebec.

There Cook was entrusted with the hazardous mission of taking soundings opposite the French fortifications at Montmorency and Beauport. The enemy discovered him one night, launched a canoe full of Indians to capture him, and he had to abandon his boat and swim ashore to the Island of Orleans.

It was on the eastern shores of North America that Cook definitely began the career which was to culminate with his last important work, in the farthest northwest of the continent. His surveys of Newfoundland and his soundings of the Gulf of St. Lawrence added navigation to his practical seamanship and made him friends which shaped his adventurous future.

ASTRONOMICAL EXPEDITION GAVE COOK HIS FIRST BIG OPPORTUNITY

Just as the entire scientific world is preparing for the total eclipse of the sun this June, so men of science laid their plans to observe the transit of Venus on June 3, 1769.

In Glasgow advertisements were inserted in the newspapers requesting citizens to put out their fires during the afternoon, so that smoke might not interfere with the observations. In Philadelphia a great crowd assembled to watch the astronomers and, being requested to maintain silence, it obeyed so faithfully that, it is recorded, "there could not have been a more solemn pause if each individual had stood ready to receive the sentence that was to give him life or death."

The Royal Society, in England, enlisted the Admiralty's aid, and obtained the patronage of King George III, for an expedition to observe this phenomenon at Tahiti, and to proceed thereafter upon an exploration of the South Pacific.

This enterprise gave Cook his first great opportunity, for he was made a lieutenant and placed in command. His first act was characteristic. He ignored suggestions about the type of ship he was to take, and would have none of the East Indian barks, or sailing frigates, or three-deckers of the Jamaica trade, but chose a coal-carrier type, built at Whitby, like the craft he so often had piloted from Newcastle to London.

Pictures of the *Endeavour* are extant. Her bow was round, her stern broad and square; she was 97 feet long and about a third as wide, and her burden was 368 tons. She was clumsy but commodious, her draught was slight, she could ground

Photograph from M. P. Adams

AUSTRALIAN BLACKS WITH A DISPLAY OF SPEARS, BOOMERANGS, AND SHIELDS: SUNDAY ISLAND

and not upturn, and she could be taken ashore for repairs.

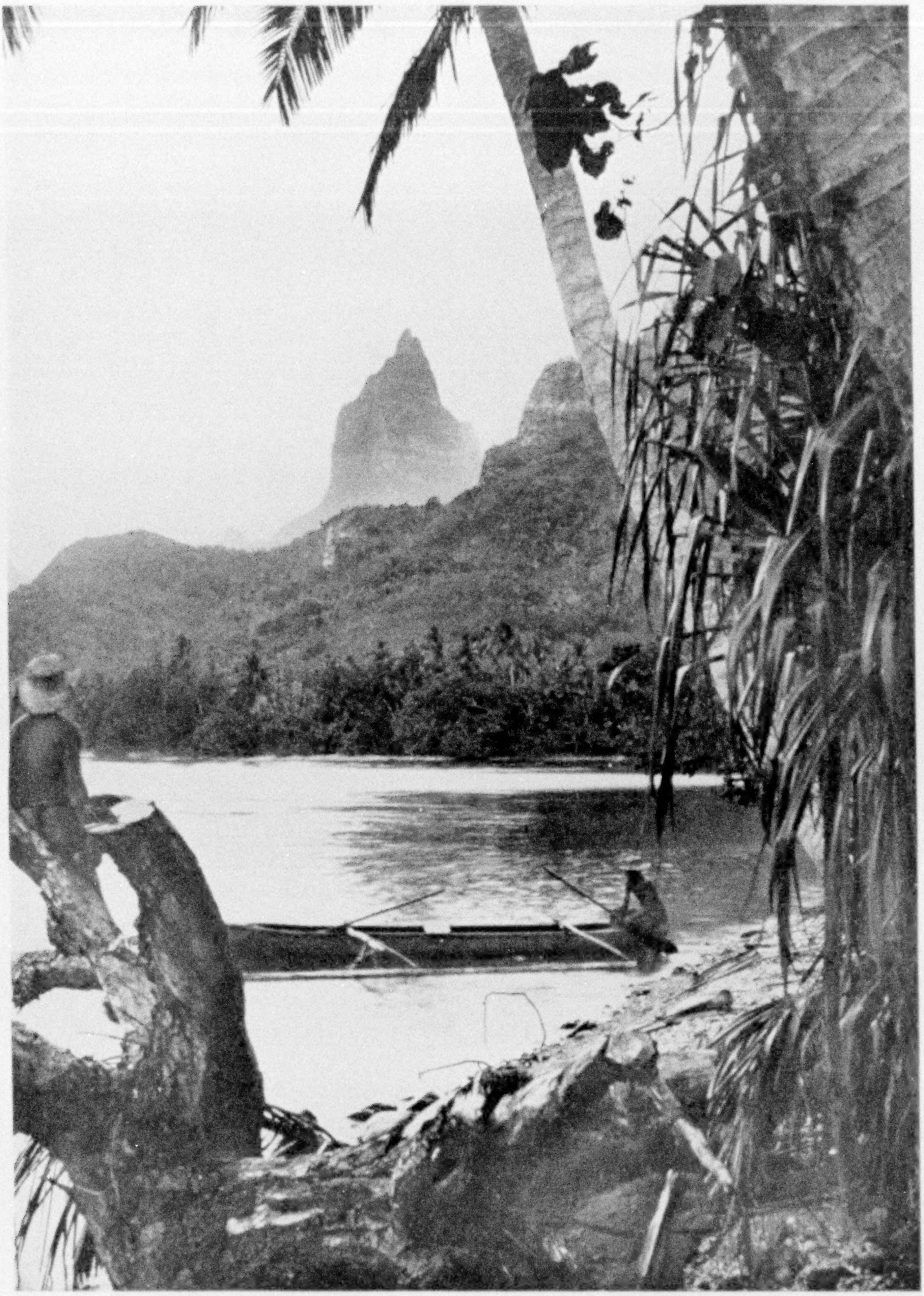
When we read of the stores she carried, including the sheep and other live stock that Cook left for breeding at various islands, and of the 85 men aboard her, with provisions for 18 months, the wonder is that she did not sink before she sailed out of the Thames.

One can imagine the *Endeavour's* crew "sizing up" their commander when he hoisted his pendant at Deptford Yard, May 27, 1768. They saw a six-foot, robust figure, with bushy brows surmounting small, keen, brown eyes. His face was long, with the high cheek bones that betokened his Scotch descent. His straight, brown hair was tied behind, as was the fashion of a day before even men had succumbed to "bobbed" locks. He was forty years of age.

They soon found their commander a man of few, but occasionally explosive, words. They came to know him as one who was never tired, seldom sick, and possessed of a resourcefulness and a pertinacity that are acclaimed as his outstanding traits.

A ROWDY, BUT LOYAL, CREW

What must have been Cook's thoughts about his crew? Aside from his officers and scientific observers — Sir Joseph Banks and Dr. Solander, pupil of Linnæus, whom his master characterized as a "hero of botany," among them—even Cook must have felt some misgivings about those rowdy, hilarious, irresponsible,



Photograph by L. Gauthier

PAPETOAI BAY AND CATHEDRAL ROCK: MOOREA, SOCIETY ISLANDS

More than a century ago King Pomare proclaimed Christianity as the religion of the natives on this island, and heathen idols and images were used as fuel for a mammoth bonfire.

Photograph by Dr. Edward Burton MacDowell

THE LIGHTHOUSE AND CAPTAIN COOK'S MONUMENT AT POINT VENUS, TAHITI

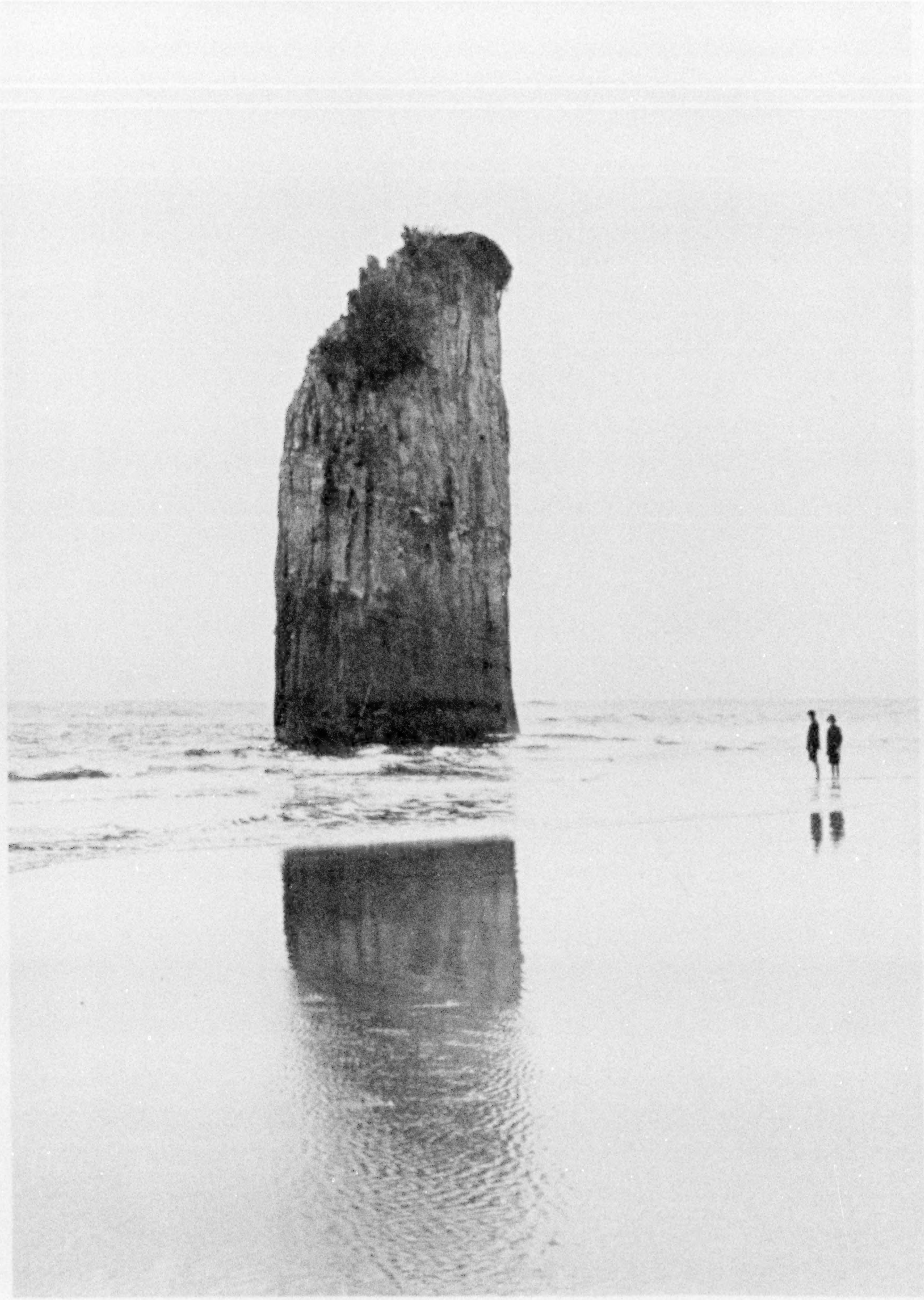
This promontory takes its name from the observations of the transit of Venus made here by Captain Cook while the thermometer registered 119 degrees Fahrenheit in the sun. This astronomical project was the major reason for the explorer's first voyage, when he named the Society Islands, which include Tahiti, for the Royal Society, the scientific organization sponsoring his expedition (see text, page 89).

loud-swearing and heavy-drinking 41 sailors and 12 marines.

"Nothing is more clear," says one historian, "than the profound ignorance and the brutality of the common sailor of the eighteenth century." He had bulldog courage (which freed the commanders from worry on this score in the face of danger), but how would he stand the long weeks aboard ship? Would he desert, would he drink himself into a stupor, would he defy the rules laid down for treatment of natives? After all, the purpose of this privation and suffering was a closed book to him.

Cook's men did all these things, but, wonder of wonders, which is the highest tribute to their commander's leadership, they did not mutiny, either on this or on subsequent voyages!

The *Endeavour* sailed from Plymouth Sound late in August, 1768, and in



© F. G. Radcliffe

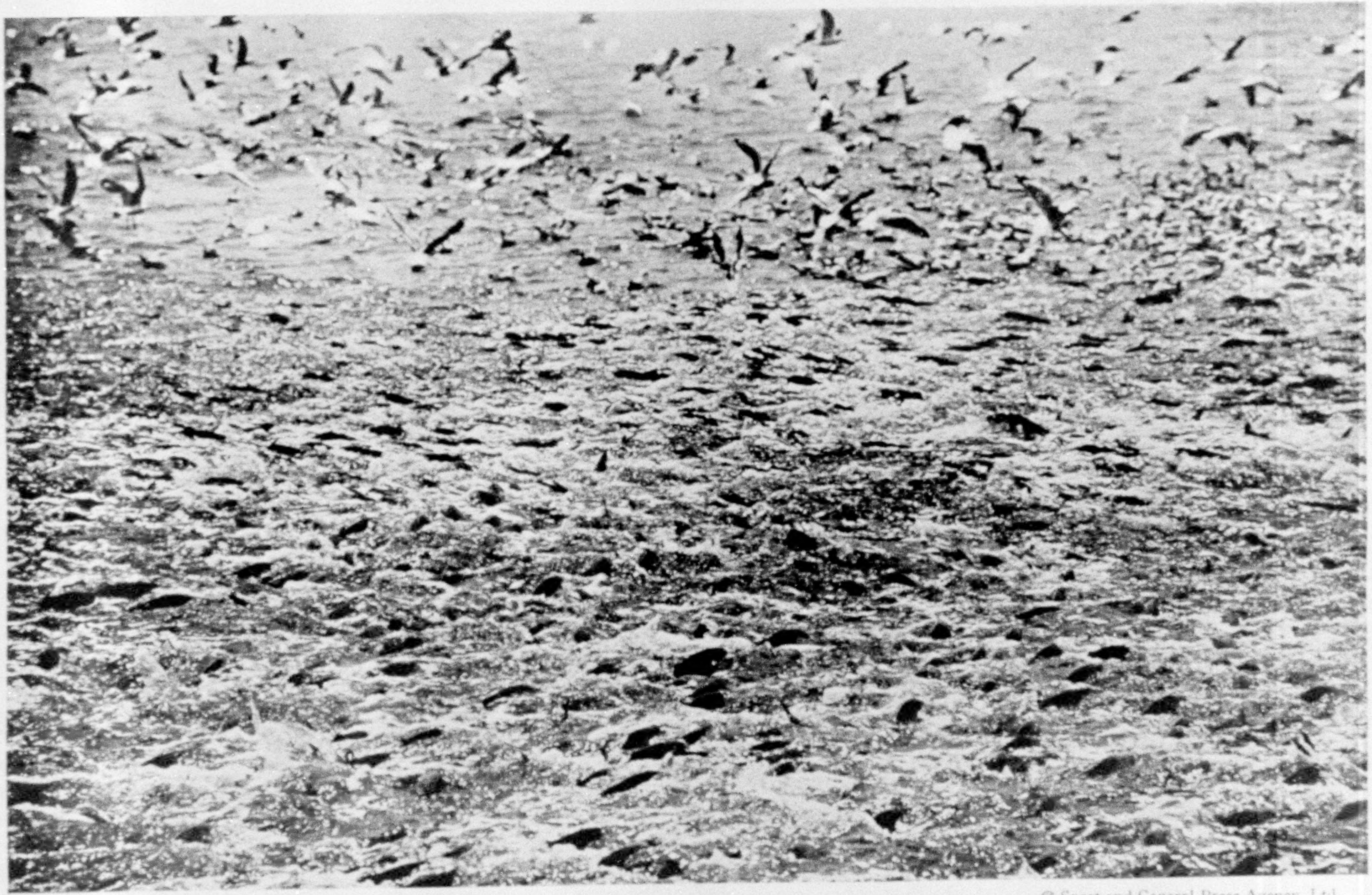
GIANT'S THUMB, CAPE FOULWIND, NEW ZEALAND

Projections such as this, and hidden rocks, in addition to the winds which prompted Cook to give the cape its name, were obstacles he encountered in charting the New Zealand coast. While off Cape Foulwind Cook wrote in his journal: "No country upon earth can appear with a more rugged and barren aspect than this does from the sea, for as far inland as the eye can reach nothing is to be seen but the summits of these rocky mountains, which seem to lay so near one another as not to admit any vallies between them."

Courtesy Auckland Weekly News

WHERE COOK PROVED THAT TWO ISLANDS COMPRISE NEW ZEALAND

In this, Cook Strait, and in 15 other important places the explorer's name is perpetuated on our world map; he gave the names they still bear to hundreds of physical features, from Vancouver to Australia and from Alaska to the island of Georgia, in the South Atlantic. Many of the names he bestowed are descriptive either of features he noted or adventures he experienced, such as Cape Tribulation, Lizard Island, Botany Bay, and Providential Channel. The top of the center ridge in the foreground now is a whaler's lookout.



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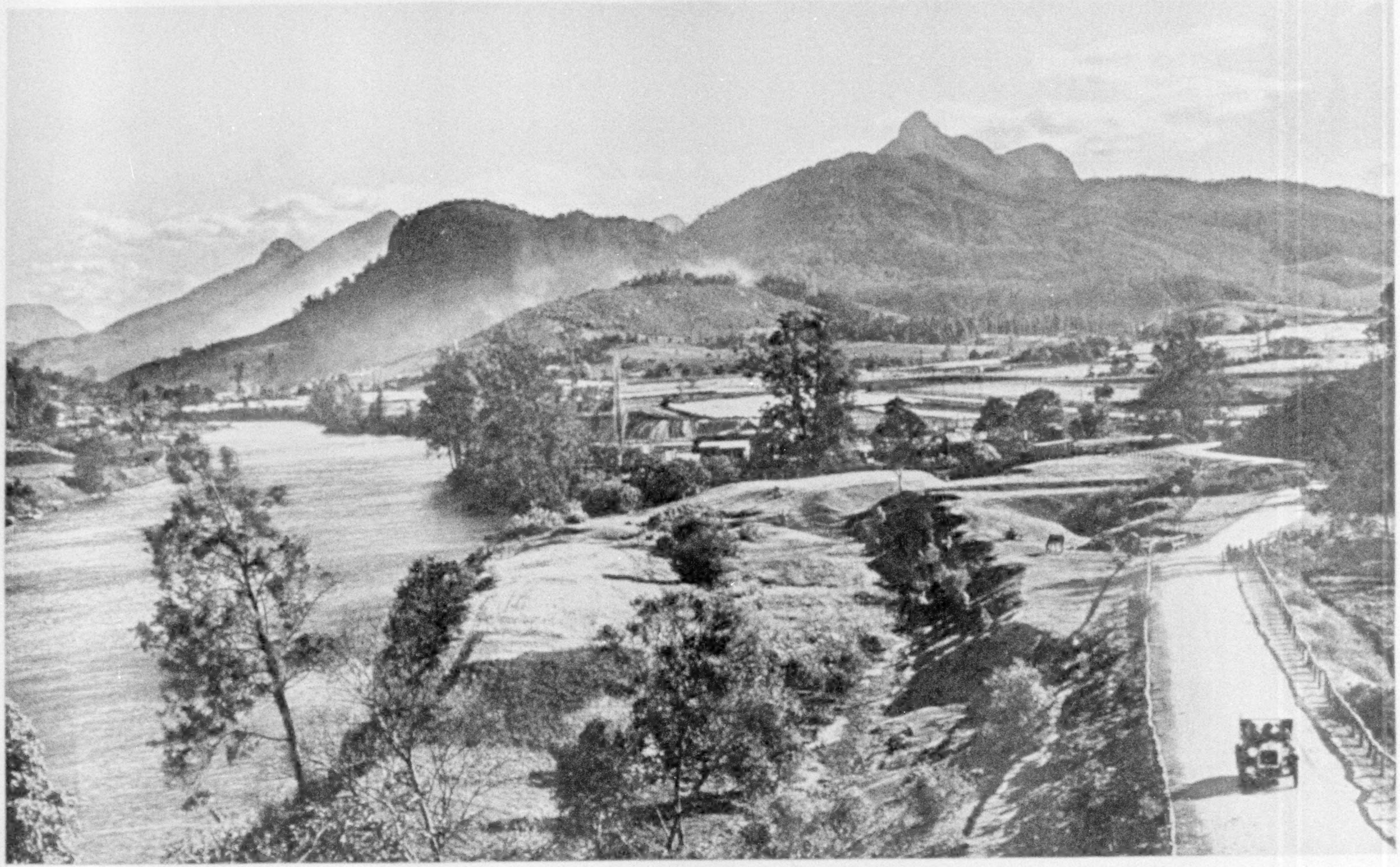
WHERE THE SEA "BOILS" WITH FISH

Acres of sea salmon and trevally off New Zealand's shores afford a rich harvest for birds, which not only feed on the fish, but afford fishermen a conspicuous guide to the shoals of sea food. This salmon is of a mottled silver-green color and averages from eight to ten pounds; the trevally is one of the forty-two most valuable and plentiful of the ninety varieties of edible fishes caught in New Zealand waters. This remarkable photograph was taken off the northeast coast of the Auckland provincial district, near the Bay of Islands (see, also, text, page 103).



Photograph by Herbert H. Fishwick

A LANDSCAPE OF THE ISLAND-CONTINENT THAT COOK ADDED TO BRITAIN'S REALM

The northern part of New South Wales, Australia, near the Queensland border, is watered and drained by the River Tweed, seen at the left of the picture. The towering peak in the background is Mount Warning, so named by Captain Cook. Its summit commands a view which is considered one of the finest and is among the most extensive in the Commonwealth. The rich flats and slopes are now given over to the growing of sugar cane, to dairying and mixed farming.

September stopped at Madeira. There the scientists were introduced at a Franciscan convent as men who could interpret the laws of Nature. The nuns, with disconcerting shrewdness, began to ask questions. "When will it thunder?" inquired one. "Will you tell us where we can find a spring of fresh water, which we so much need?" asked another.

Cook encountered a different type of intelligence at Rio de Janeiro, where the Portuguese governor conceived the transit of Venus to be "the passing of the North Star through the South Pole."

HEROIC MEASURES PREVENT SCURVY

Many years later American engineers found they must conquer yellow fever before they could build the Panama Canal; Cook realized from the outset of this voyage that he must prevent scurvy if he was to reach the remote areas of the Pacific.

At Madeira he sentenced a marine and a sailor to 12 lashes apiece for refusing to eat the fresh meat, onions, and fruits he bought for them. Sailors were not epicures; scant rations of salt junk, worm-eaten oatmeal, and rancid butter made up their accustomed diet. They insisted only on their gallon of beer, the daily allowance of that time, or a half pint of rum or brandy in place of it. But 20 pounds of onions for each man one week, followed by 10 pounds more only a few weeks later! That was too much. All protested and two rebelled.

Indeed, they grumbled their way around the Horn and across the broad Pacific; none knew what the next mess would bring. There was sauerkraut, then coconut milk, and even grasses that the captain gathered on the islands, had cooked up, and compelled them to eat.

Another freakish idea of their commander, they complained, was the constant cleaning up and "smoking" of their quarters.

Cook executed one of his bold ideas, akin to his choice of his ship, when he took his little vessel around Cape Horn, which was considered so perilous that navigators of that day preferred the tedious trip through the Strait of Magellan. It once took Captain Wallis four months to get through.

After touching at several small islands, Cook, on April 13, 1769, reached Tahiti, and began his exploration of the archipelago, which he named the Society Islands, in honor of the Royal Society under whose auspices he had sailed (see p. 89).

THE TOPSY-TURVY WORLD OF POLYNESIA

Familiar as we now are with the idyllic setting of the South Seas and the many curious customs of the natives, it is hard to realize the amazement of these voyagers, the first to observe intimately the exotic life of Polynesia, or to comprehend the excitement their tales aroused when they returned to England.

It was a new world they gazed upon; in many ways a topsy-turvy one. What must have been the embarrassment of the studious Dr. Banks, for example, at the ceremonial welcome he received, which consisted of the men taking off their garments and putting them on him and the members of his party?

And, worse yet, when chiefs, to pay him exceptional honor, brought beautiful maidens to stand before him, disrobe, and, in this Evelike state, chastely to embrace him and retire? Or, again, when he desired to placate one chief and that brown dignitary, as a token of reconciliation, insisted that he and his wife must pass the night in the perturbed doctor's tent?

At times the natives seemed acutely shrewd. They soon realized Cook's strategy in holding their chieftains as ransom for the return of stolen property, and promptly turned the tables by seizing one of his men. In other ways they were childlike. Oberea, a sort of queen emeritus, was given many presents, but the one which delighted her most of all was a doll. The brawny island sovereign, Tootahah, grew so jealous of this gift that he had to be given one, too.

The visitors soon found that the economic laws of Lombard Street were binding in this coconut-grove exchange. Only authorized persons might trade with natives and it was forbidden to exchange nails and cloth for anything but provisions, lest those items depreciate in value. Soon exchange rates were established: a 4-inch nail, for example, bought 20 coconuts.

Despite all the word pictures that have been painted since, Cook's own account of

Photograph by William Reid

FEEDING KANGAROOS IN THE PUBLIC GARDENS OF CHRISTCHURCH, NEW ZEALAND

Not only scientists, but children, gathered round when Cook's ships sailed into their home ports. On the *Endeavour*, along with a goat that had traveled around the world, was a kangaroo. One of Cook's sailors was the first white man to see this animal (see text, page 106). Among his other distinctions, Cook deserves high rank as a patron saint of the modern zoo and circus.

his first three months' stay at Tahiti, abounding in astute observations and interesting facts, remains as one of the most fascinating. He describes in greatest detail the process and patterns of tattooing; he gives the recipe for fermenting the sour paste made from breadfruit; he describes the islanders' burial rites and dances, wherein they would "shake themselves in a very whimsical manner"; he writes down their 4-note musical scale and the method of "fingering" their nostril flutes; he relates that they bathe three times a day.

Some of their practices sound modern, such as the women cutting their hair short and the agreements among incompatible couples to live apart for a time. Others reverse civilized procedure, such as the insistence of families upon sleeping together but eating apart, in silence.

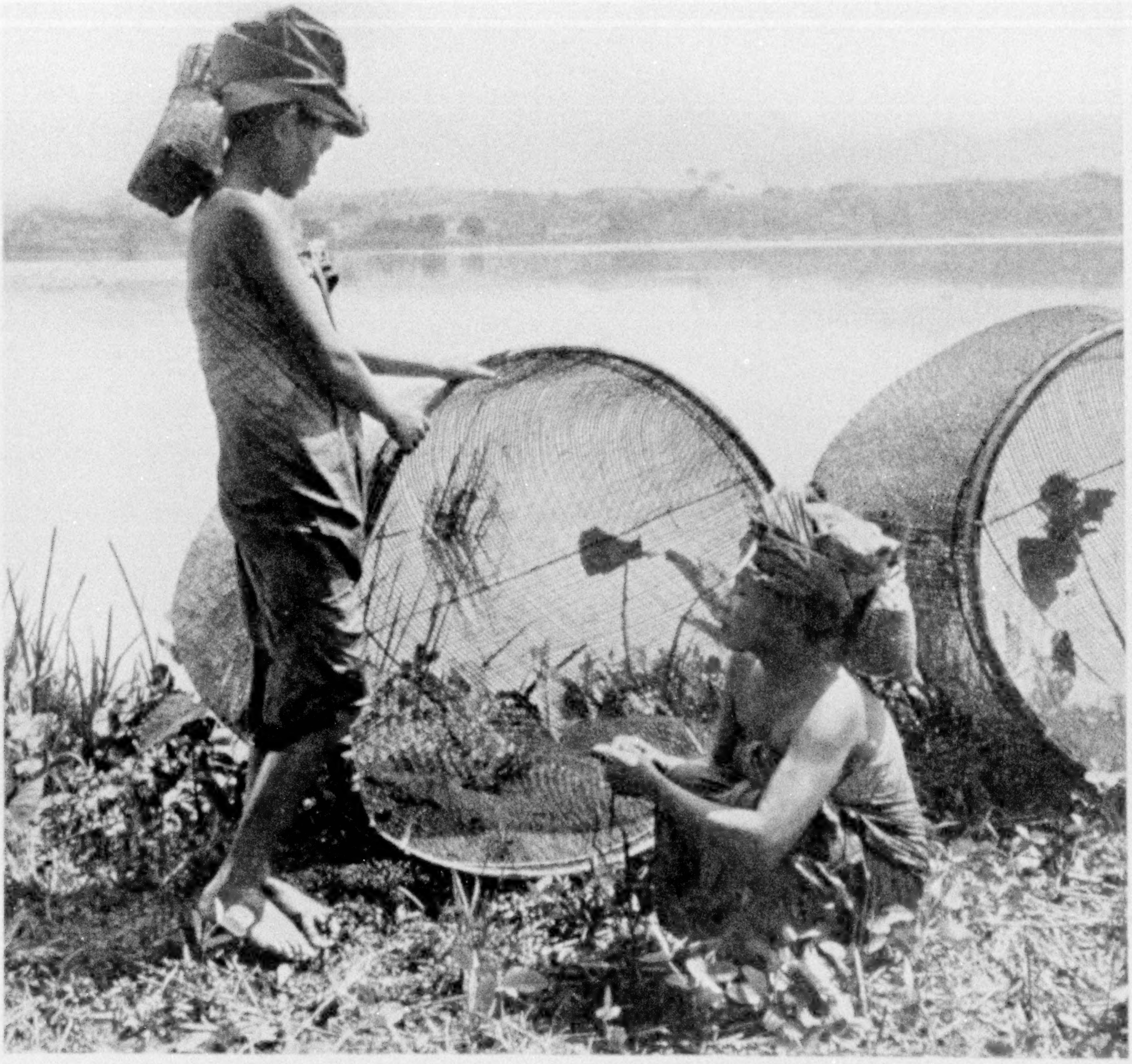
It is a curious circumstance that it was more than a century after his first voyage that Cook's own journal of that voyage was published. In the meantime the main reliance of the reading public had been upon the verbose Hawkesworth, who combined the journals of Cook, Solander, and Banks and interjected his own views, and upon the comprehensive but ponderous biography of Andrew Kippis.

The *Endeavour* eludes a reef and Cook remarks, "We were well out of it." According to the good Dr. Kippis, "So happy a change in the situation of our voyagers was sensibly felt in every breast and was visible in every countenance."

SPORTS-REPORTER COOK DESCRIBES A TAHITI WRESTLING MATCH

Herewith, in the words, diction, and spelling of Cook, is his description of a Tahiti wrestling match:

> Everything being now ready, several men entered the Theater, 8, 10, or 12, sometimes more. These walked about in a Stooping Poster, with their left hand upon their right breast, and with their Right hand Open struck with a smack their left Arm and fore-arm. In this manner they walked about until one Challenged another,



Photograph by Dr. Edward Burton MacDowell

LAKE FISHERWOMEN OF JAVA

Walking hip deep, in a long line, side by side, and pulling or pushing their nets through the water, Javanese fisherwomen use their baskets as seines. The shapely brown bodies of these comely maids and matrons are covered with little more than a turn or two of batik cloth.

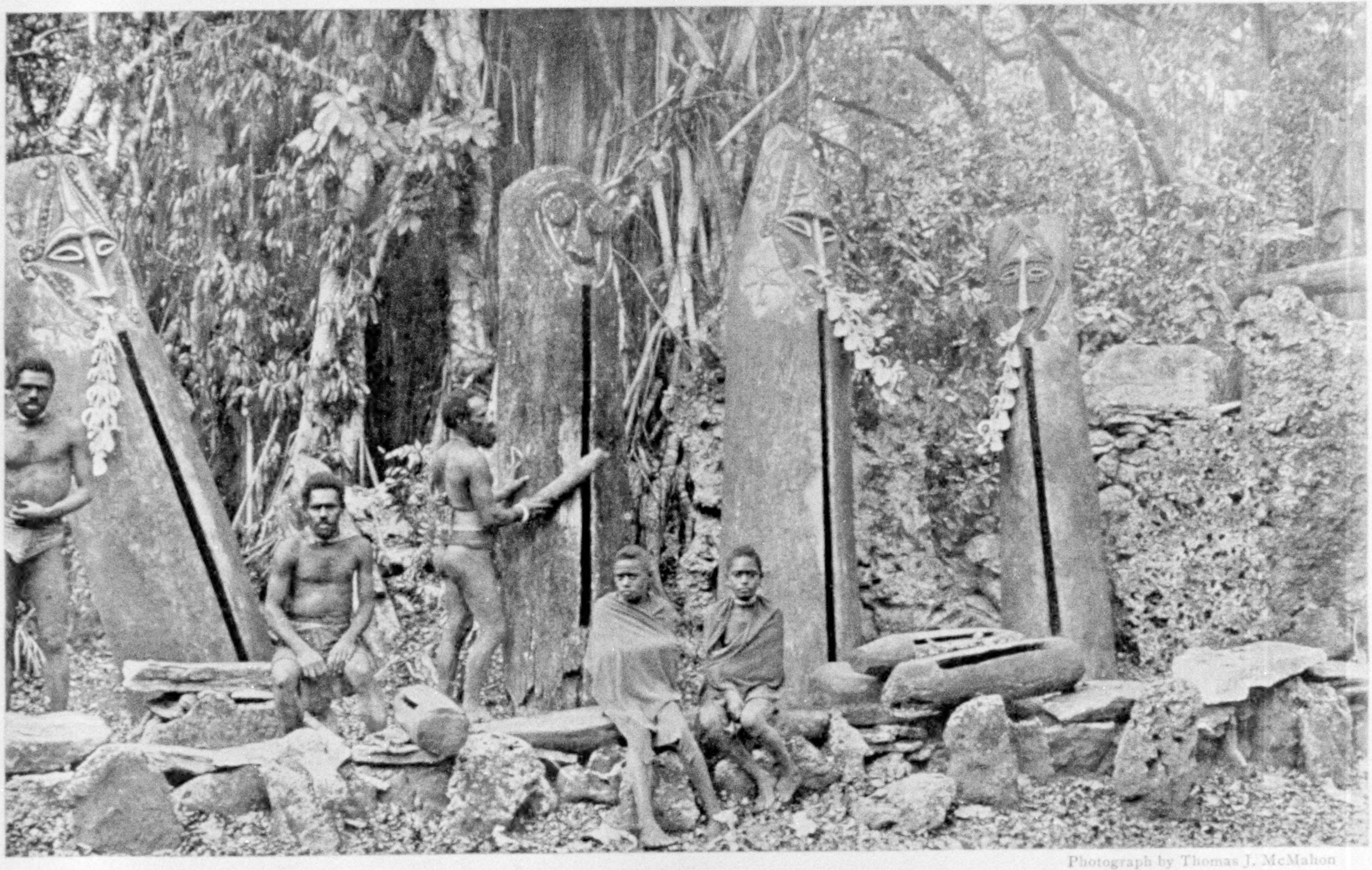
which was done by motion and jesture, without speaking one word.

The 2 Antagonists would then meet and endeavour to seize each other by the thighs, but if that fail'd they would seize each other by the Hair of the Head or where-ever they could, and then Wrestle together until by main Strength the one or the other was thrown on his back. This was always (Except once) followed by three Huzzas from some old men who sat in the House, and at the same time another Company of men would dance for about a Minute, the Wrestlers all the time continuing their game without taking the least notice of anything else. The only dexterity the Wrestlers seemed to make use of was in first seizing each other, for after they had closed it was all decided by Main strength.

It would sometimes happen that neither the one nor the other could throw his Antagonist; in this Case they would either part by mutual consent or were parted by others. The Conqueror never exulted over the Conquer'd, neither did the Conquer'd ever repine at his ill luck, but the whole was carried on with great good Humour.

WESTERN GIFTS CHANGE ISLAND GEOGRAPHY

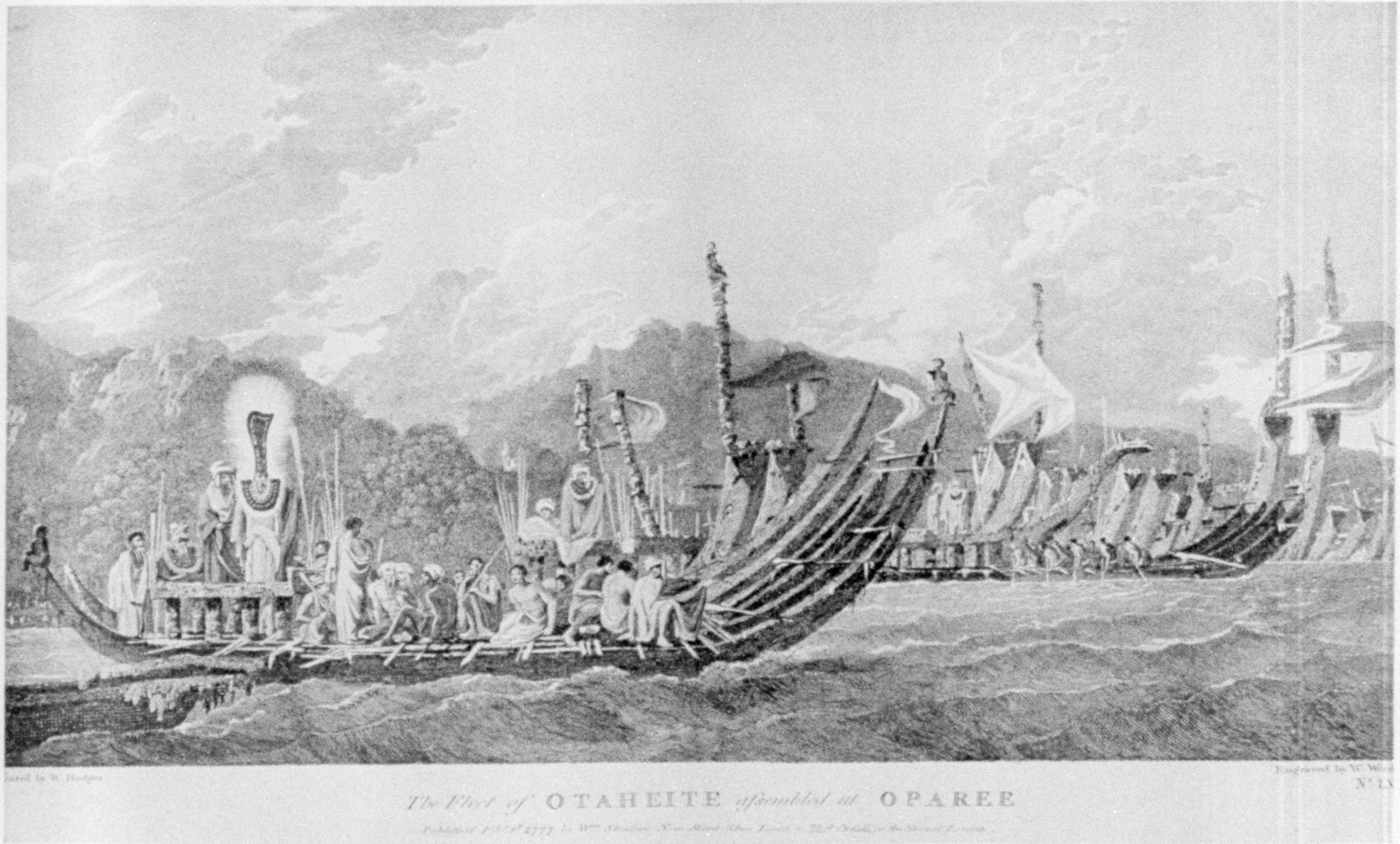
Before leaving Tahiti, Cook planted watermelons, oranges, limes, and other seeds—an activity which, in addition to



Photograph by Thomas J. McMahon

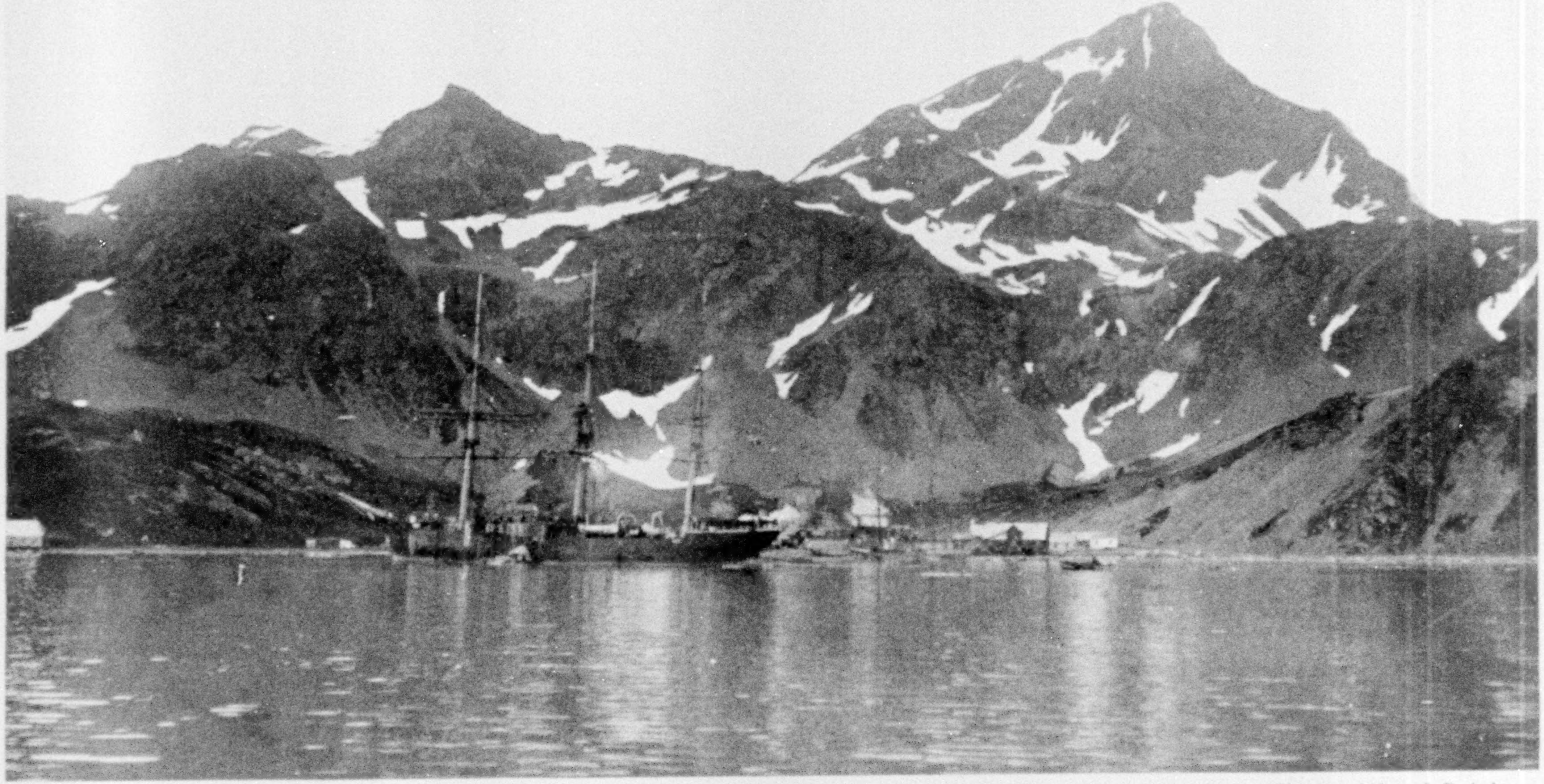
THE CEREMONIAL DRUMS OF NEW HEBRIDES NATIVES

Every native village in the New Hebrides archipelago has its dancing ground, and the men meet on moonlight nights to perform fantastic antics to the booming of their deep bass drums. Some of these instruments, carved from trunks of trees, are eight feet or more in height. The noises they make are deafening. One rite is the memorializing of former chiefs in effigy. A crude statue of clay and fiber represents that dignitary and his actual skull is used for the framework of the head. Around this gruesome image the festivities take place.


…nted by W. Hodges
Engraved by W. Wo…
N° LX…
The Fleet of OTAHEITE assembled at OPAREE

WHY CAPTAIN COOK NEEDED A CAMERA

Realizing the value of a pictorial record, the explorer engaged a landscape painter for his second voyage. This engraving of a Tahitian fleet is one of the results. The artist sketched in what he could and later trusted to memory for further details. The result is portrayal of South Sea natives in the garb of classic Greece, an unwitting honor he also conferred upon the aborigines of New Zealand (see text, page 108). This sketch is reproduced from a volume of Cook's voyages published in London in 1784.



Photograph from J. P. Ault

THE FIRST SOUTH POLAR LAND KNOWN TO MAN

South Georgia was rediscovered by Captain Cook in 1775, and it was at Grytviken, King Edward Cove, here shown, that Sir Ernest Shackleton died. After gazing upon these bleak and desolate mountains, Cook sailed away with the comment that he did not believe anyone would ever be benefited by the island's discovery. That did not deter him from noting, with his usual thoroughness, the seals, which he called "sea-bears"; sea elephants, penguins, and also the albatrosses, terns, gulls, and other birds that circled over the surrounding waters. He even described the titlark (*Anthus antarcticus*), the one land bird peculiar to the island. Whales off South Georgia's shores provided glycerin for explosives along the Western Front during the World War (see text, page 125).

his subsequent gifts of poultry and pigs at other places, changed the geography of many islands.

Cook did not get away, however, until two marines had felt the lure that was to attack many adventurers of a later day. They were recaptured in a mountain fastness, where each had taken to himself a tattooed wife trained not only to gather his coconuts and breadfruit, but to feed him silently at mealtime, and to make cloth and fishlines of tree bark and coconut fiber.

The only comfort they would have lacked, had they stayed, would have been their tobacco, which was unheard of in the island before Cook's visit.

One day Cook's friend, Tomio, rushed to Dr. Banks' tent to tell him that chief Tubourai Tamaide was dying, having been poisoned by a sailor. In great alarm Dr. Banks hastened to Tubourai. He was sick enough, and paler than any brown man the doctor had seen, but brief inquiry proved death was not imminent. He had begged some tobacco from one of the ship's company and swallowed it. Dr. Banks prescribed a liberal draft of coconut milk.

When they sailed away the voyagers took along an intelligent native, Tupia, who henceforth was to help them considerably in locating additional islands and in their intercourse with other island peoples, for the Tahitians often cruised two or three weeks, or even a month, at a time in their 70-foot canoes.

MAORIS OF NEW ZEALAND EXCITE WONDER

Cook sailed among other islands of the Society group, then struck out to the westward and, in the course of his voyage to New Zealand, exhibited again his persistent streak of thoroughness. Though he did not share the belief of many geographers in a southern continent, he forsook the fair wind and fine weather to go out of his course, for 1,500 miles, into bad weather, to check further on the possibility of land.

After a rough, squally voyage he put in at New Zealand near where Gisborne since has risen. Years later the children of the natives told the story, handed down, of the time when a great bird, with large and beautiful wings (sails), had swooped into the harbor and hurled thunderbolts at them.

At first the explorers were shocked by the frank cannibalism of the Maoris, some of whom would not come near the ship until they were assured that white men did not eat human beings. Then they were amazed at the neatness of the native fenced-in villages; at the fortifications, whose efficacy the British soldier later was to experience; at the huge seagoing canoes, with their grotesque carving, and at sanitary arrangements which were said to surpass those of that day in the palace of the King of Spain.

SAILOR IS FLOGGED FOR PLUNDERING A MAORI

Cook not only charted the shores, he described the patterns the Maoris painted on their faces. The Maori mealtime must have made him yearn for the silence of a Polynesian feast, for here the repast was accompanied by the wailings of a mourning widow, who punctuated her cries by cutting her face, arms, and breasts with a shell. The Maori diners were not affected by this and exhibited other evidences of stoical insensibility; yet Cook persisted in his policy of humane and fair treatment toward them. He flogged a sailor for stealing from a native, and when the seaman protested that it was no crime to plunder an "Indian," Cook ordered six more lashes.

In their desire to explore this new land's shores, and because of the need for careening their ship, it would not have been surprising had they gone about their main business and left the botanical curiosities of this interesting, isolated land to future study. Instead Cook describes the songs of birds, which "seemed to be like small bells, most exquisitely tuned," makes a sketch of a huge natural arch, notes that sand contains iron, measures the growth of trees, tells about the delicate and delectable fish that abound offshore, and reports that some 400 plants of species unknown to England were collected.

NEW ZEALAND'S DIVIDING STRAIT EXPLORED

Cook's thoroughness in exploring the island which Tasman had sighted and called Staten Land is memorialized in the name of Cook Strait. After determining

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PENGUINS AND ICEBERGS WERE COOK'S PRINCIPAL SOUTH SEA GUIDES

"I firmly believe that there is a tract of land near the (South) Pole, which is the source of most of the ice that is spread over this vast southern ocean," wrote Cook, who always expected to find land near by when he encountered penguins.

that the land to the north was separate from the land to the south, some of Cook's men still held to the notion that the northern island must be a part of a continent. So the leader, heading south, doubled back through the Strait and sailed to Cape Turnagain doubly to verify his conclusions.

Besides numerous descriptive names which Cook gave to coastal features, he also exercised the explorer's prerogative of writing the names of men who made his work possible—Brett, Palliser, and Campbell—upon the map of New Zealand.

He cruised for six and one-half months, along some 2,400 miles of coast, charting as he went, and his accuracy later was attested by an officer of a French expedition who, after comparing his chart with Cook's, wrote: "I found it (Cook's) of an exactitude and of a thoroughness of detail which astonished me beyond all power of expression."

Once more the *Endeavour* set sail toward the setting sun, and on April 28, 1770, put in at Botany Bay, Australia. Steering northward, she began a coastal voyage which constitutes a classic of the men who go down to the sea in ships.

Cook named Port Jackson, noting that it would be a "safe anchorage"; but he did not enter the inlet where beautiful Sydney has grown on the hills above a magnificent harbor to be a Rio de Janeiro of the Pacific.

THE "ENDEAVOUR" GROUNDS ON THE GREAT BARRIER REEF

Headland after headland was shrouded in smoke as he sailed along; not until later did he learn that the phenomenon was a primitive "wireless" device of the black men, who were using smoke signals to broadcast the coming of a strange craft.

Names given to physical features of the east Australia coast recount the adventures and observations of Cook's northward progress—Broken Bay, Cape Three Points, Three Brothers, Smoky Cape, Mount Warning, Point Lookout, Glass Houses, Sandy Cape, Bustard Bay, Cape Capricorn, Magnetic Island, and Cape Tribulation, where the *Endeavour* ran aground on a reef.

All hands rushed on deck, soundings were taken, overboard went oil jars, hoop-staves, stores, iron and stone ballast, even six quarter-deck guns; but still the ship held fast. At high tide every effort to haul her off failed—a fact that puzzled Cook, for he did not realize that in those waters it is only every other tide that rises to its full height.

Indeed, the rising tide which had been counted on for succor nearly brought disaster. Leaks increased, and two pumps working constantly, then a third, could not keep pace with the inrush of water. At the next high tide heroic efforts to heave the vessel off met with success. But the water poured in faster and faster. Then a sudden increase brought despair, until it was found that a relief man had made an error in his estimate of the intake of water.

A MIDSHIPMAN'S SUGGESTION SAVES THE SHIP

The plight was desperate. A hardened sailor in such a shipwreck would have hopes of making the shore with the aid of a floating timber; but what refuge would the shore hold? Black cannibals, who might eat the unwitting visitor? Or a lifetime of exile far from the accustomed paths of ships?

When the mistake of measurement was cleared up, "it acted upon every man like a charm; they redoubled their vigour," writes Cook in his journal.

A midshipman offered a suggestion which enabled Cook to proceed without putting in for repairs on a highly inhospitable shore. Oakum and wool were sewn on a sail, which was then smothered with dirt. It was lowered from the bow and dragged back over the worst of the leaks. Within a quarter of an hour the ship was pumped free of water, and thereafter a single pump kept her so until a favorable harbor was found for repairs.

This was *only* the first of Cook's encounters with the Great Barrier Reef; on another occasion, after prolonged maneuvering, his ship was saved from being dashed to pieces by a faint breeze, "so small that at any other time in a calm we should not have observed it."

Ancient mariners imagined that fantastic creatures inhabited the farther reaches of the ocean. But they scarcely conjured anything stranger than the tiny sea crea-

Photograph by Dr. Edward Burton MacDowell

WHERE UNCLE SAM SHOPS FOR SOAP

Rarotonga is the most fertile of the widely scattered Cook Islands. The United States is the chief purchaser of the copra, extensively used in soap, toilet preparations, and margarine, which is the principal export of the harbor here shown.

tures that, through the centuries, built up this enormous sunken range, 1,200 miles long, to challenge comparison with man's mightiest construction, the Great Wall of China.

Heroic in the face of frequent dangers, the crew's conduct at other times emphasizes the quality of Cook's leadership. There was what he calls the "very extraordinary affair" of Orton, his clerk. His journal relates:

> He (Orton) having been drinking in the evening, some Malicious person or persons in the Ship took Advantage of his being Drunk, and cut off the Cloaths from off his back; they sometime after went into his Cabin and cut off a part of both his Ears as he lay a Sleep in his Bed.

In the account of the investigation that ensued no word of censure is passed upon Mr. Orton for being "drunk."

THE FIRST GLIMPSE OF A KANGAROO

The report of the strange new animal, the kangaroo, was brought in by a sailor, who said it was "as large as a one-gallon keg, and very much like it; he had horns and wings, yet he crept so slowly through the grass, that if I had not been *afeard* I might have touched him."

Cook subsequently measured and described in detail a kangaroo shot by one of his men. He compiled long lists of animals, birds, and snakes; he told how the native men punctured their noses to insert ornamental bird bones; he described the use of the throwing sticks and boomerangs, and even compiled a working dictionary of native words.

After sailing through the strait which, although previously navigated by Torres, was so little known that New Guinea and Australia still were shown on maps as a single land body, and touching at New Guinea, Cook put in at Batavia, there ending the significant part of his first voyage.

Up to this time he had not lost a single man by sickness, but the unhealthful season at Batavia cost him 7 lives, and 23 others died on the way home as the result of dysentery contracted there.

When he arrived in England his conquest of scurvy was acclaimed as one of his principal achievements. The importance of his work in New Zealand and Australia was not widely recognized until later, but the descriptions of the flowers, birds, animals, and fish observed and specimens of native craft collected attracted wide attention. Cook was promoted to the rank of commander and received by the King, to whom he presented a copy of his journal.

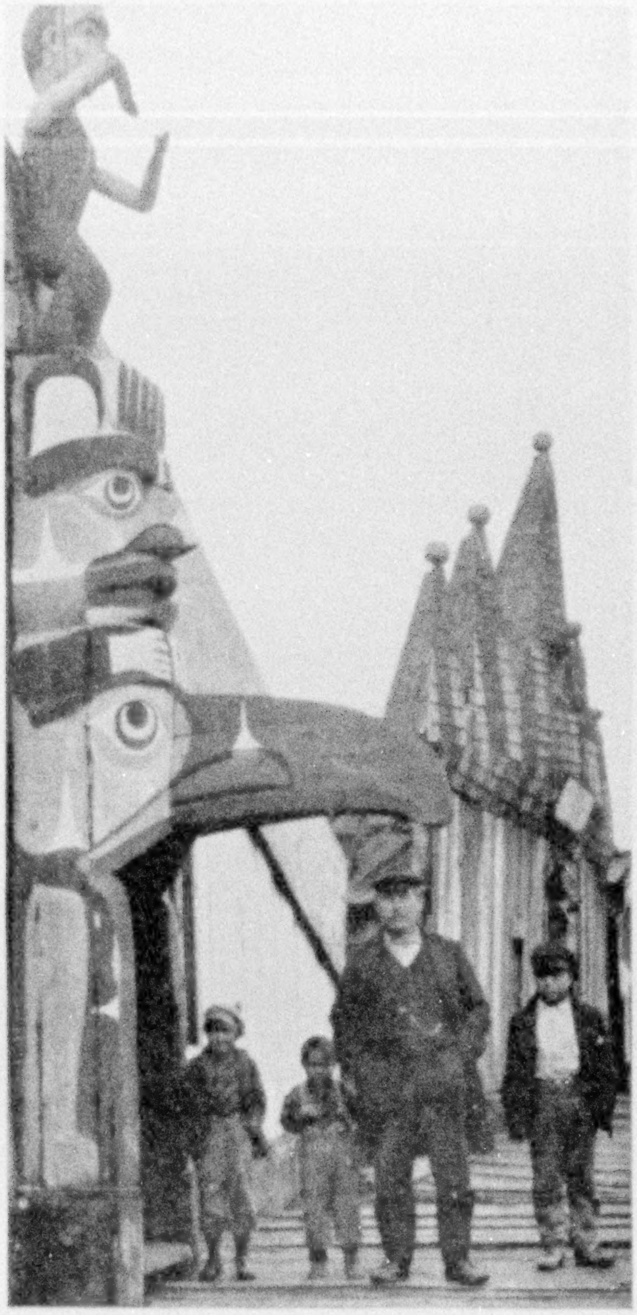
On this one voyage Cook had added enough to his country's possessions and future commercial empire to make his name immortal. But that was only his beginning.

OUTFITTING FOR A VOYAGE TO THE ANTARCTIC

Some months before Cook's return from his first voyage, in 1771, Dalrymple's Voyages was published, with a dedication to the future explorer who should discover the great southern continent. Faith in that hypothesis was widely held. Every time an explorer had found a headland or sighted an island in the southern Pacific it was put down on the map as a part of that continent. Dalrymple's Collection fanned the flame of interest and an expedition was planned to determine, for all time, the existence of such land. Cook was chosen for its leader.

Two ships were fitted out, the *Resolution* and the *Adventure*, similar in size and type to the *Endeavour*, and the frame of a 20-ton vessel was put aboard each, to be used as a lifeboat in emergency. Cook went aboard the *Resolution;* Tobias Furneaux, a valued lieutenant of Wallis, commanded the *Adventure*.

Inasmuch as Cook had never heard of vitamins, the list of edibles he included



Photograph by Harold Fleming

AN INDIAN HOME WITH ITS TOTEM POLE: VANCOUVER ISLAND

Twenty or more Indian tribes that roamed Vancouver Island when Captain Cook landed there are grouped under the general term Nootkas. Friendly Cove, in Nootka Sound, from which they took their name, has been called the "home of tame Indians and wild totem poles." The natives of the northern part of the island probably live more nearly in their aboriginal state than any others north of Mexico. Some travelers profess to recognize in the tunes which mothers croon to their babes melodic traces of songs popular in England when Cook's expedition left home.

in his supplies is interesting: malt, sauerkraut, salted cabbage, portable broth, lemons, carrot marmalade, juices of wort and beer, and gallons of saloop, a drink made from sassafras bark and other plant ingredients.

In addition to being provisioned for three years, the ships carried large numbers of bulls, cows, rams, goats, ewes, fowls, and a heavy cargo of articles for trading with natives.

Cook's keen appreciation of the fact that the value of his work lay largely in the information he could bring back led him, this time, to engage additional scientists, including the two Forsters, father and son, and also William Hodges, a landscape painter, who was to keep busy making drawings of places and peoples.

One follows his adventures with keen regret that photography had not yet developed as a chief aid to exploration. Scene after scene he describes on this voyage cries aloud for a camera.

A SOUTH SEA ARMADA

What a panorama in that Bay of Tahiti, again visited, where the Englishmen saw a native regatta of 160 double canoes with huge uplifted prows, like the roofs of Chinese pagodas, flying great flags and pennants, flanked by a second line of 170 smaller craft, each with a tiny cabin on it!

Aboard the 330 vessels Cook estimated that nearly 8,000 warriors and rowers were recruited for an expedition to put down a rebellion on a neighboring island. The warriors were armed with clubs and spears and wore colorful turbans and huge helmets and breastplates.

On shore was a great gathering, watching this South Sea armada, whose men, writes Forster, were "all well proportioned, and some would have been selected by Phidias or Praxiteles as models of masculine beauty, while," he adds, "the Sex, the partners of their felicity, are likewise well formed."

Easter Island was explored and words failed to reveal what a snapshot could have told of the curious monuments, mighty platforms, and strange images built by hands that still are unknown after years of study since Cook gazed upon them. The "prodigious ice mountains" of the southern seas, the whales, the petrels and the albatrosses, and the grotesque penguins could only be described.*

Hodges painted busily, but whatever artistic value his work may have had, the painter's eye lacked the omniscience of the camera lens. He sketched one scene which must have been impressive, that of New Zealand aborigines bringing in huge loads of fruits and other foods for trade, but in filling in the picture later his memory must have faltered, for he attired them in the classic costume of Attica rather than the native apparel of New Zealand (see, also, page 101).

He portrayed another tribe and overlooked an interesting detail: many of the adults had lost the joints of their little fingers, their customary mourning symbol for the death of parents.

But the high achievement of the second voyage, unlike the first, was on the sea, rather than in the lands visited. It lasted three years and 16 days. For one period Cook was at sea for 122 days; at another time for 117 days, upon the latter occasion sailing for more than 10,000 miles over strange seas without once sighting land.

THE PACIFIC EXPANDS TO CORRECT PROPORTIONS

Cook was the first Englishman to pierce the Antarctic Circle, dipping nearer the South Pole than any other voyager had or was to venture again for fifty years. The Terra Incognita fades away. The Pacific expands to its true proportions—some 9,300 miles from the Bering Strait to the frozen waters of the Antarctic. Another large island, New Caledonia, breaks its vast expanse, and smaller ones take shape.

Of all Cook's discoveries, the isolated little island he named for his sovereign, lying 1,000 miles east of Cape Horn, seemed the bleakest, most barren and worthless. Yet South Georgia years later was to become famous for its sea elephants, its fur seals, and as the seat of the world's greatest whale fishery.† During the World

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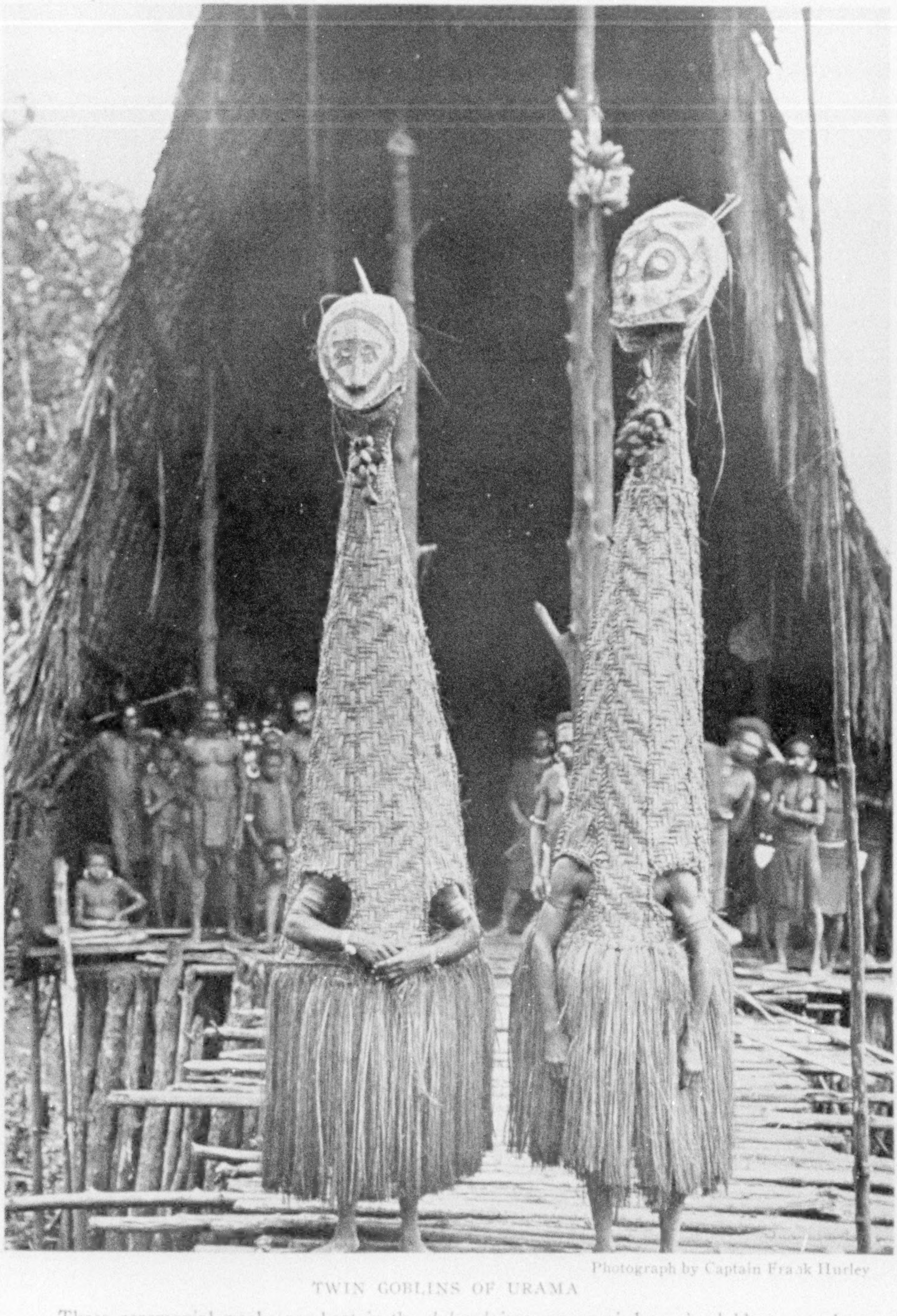
* See, also, "The Mystery of Easter Island," in the NATIONAL GEOGRAPHIC MAGAZINE for December, 1921.

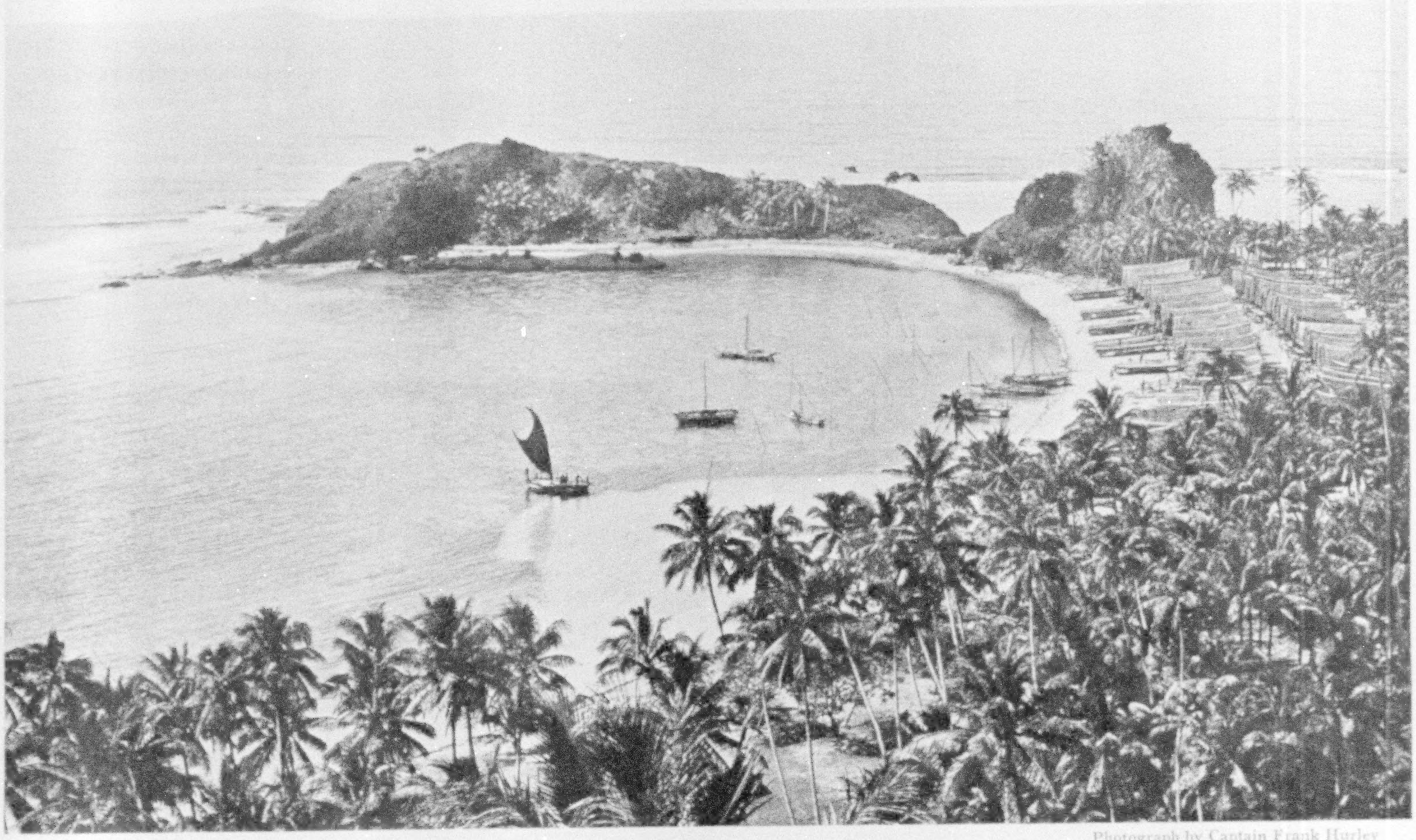
† See, also, "South Georgia, an Outpost of the Antarctic," by Robert Cushman Murphy, in the NATIONAL GEOGRAPHIC MAGAZINE for April, 1922.



Photograph by Captain Frank Hurley

TWIN GOBLINS OF URAMA

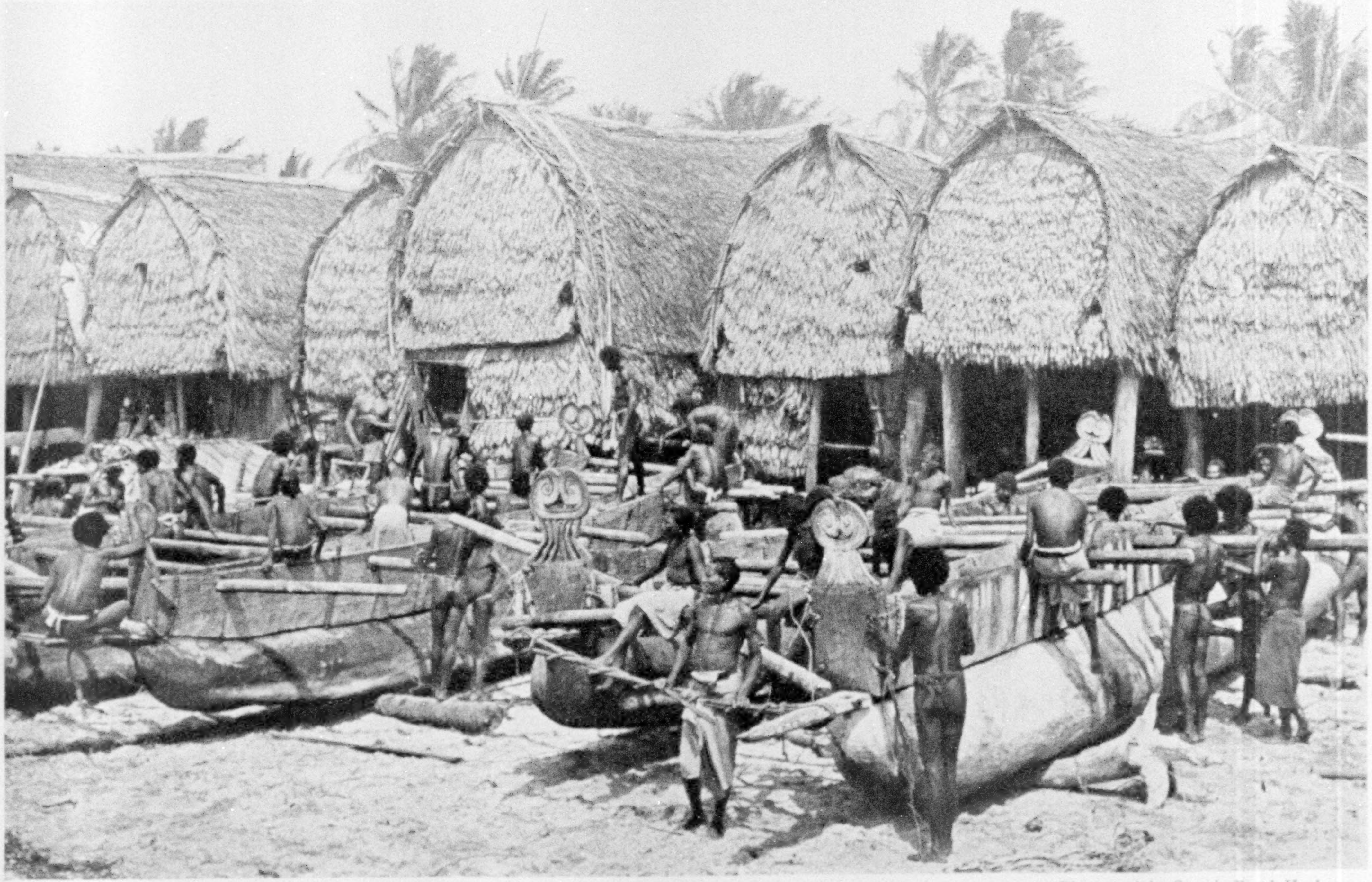
These ceremonial masks are kept in the *dubu daima*, or married men's clubhouse, and are used by the tribal elders of British New Guinea (Papua) in their incantations, especially when they are placing tabus on certain fruits and vegetables which they wish to reserve for their own use. On his first voyage Captain Cook passed through Torres Strait and established the fact that New Guinea and Australia were separate land bodies (see map, page 87).



Photograph by Captain Frank Hurley

MAILU'S PALM-FRINGED CORAL STRAND

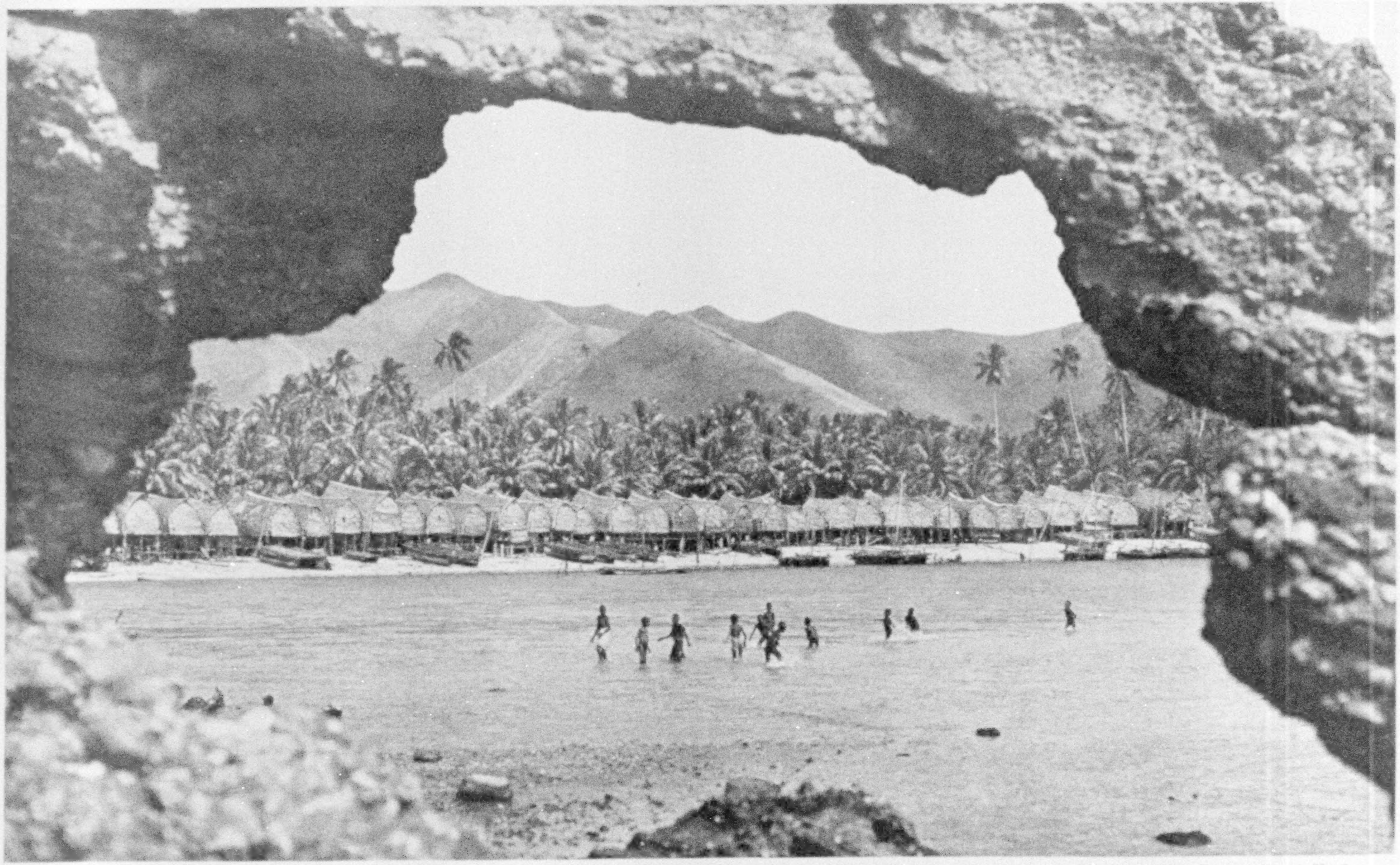
This island, near the southeastern extremity of New Guinea, is barren, save for a strip along the coast, and is incapable of supporting its population. As a result, many of its people have had to seek other than agricultural pursuits and have developed a flourishing trade in clay pots and shell ornaments with the natives of the New Guinea mainland. The Mailu natives travel in seaworthy canoes equipped with crab-claw sails like that in the middle foreground (see, also, illustration, page 111).



Photograph by Captain Frank Hurley

PREPARING FOR A PAPUAN REGATTA

A stone adz is the principal implement used by the New Guinea native in hollowing out and shaping his canoe from a great log. Certain seasons of the year are regarded as being especially favorable for canoe-building, and after each boat is completed a stick must be thrown from end to end. Several bulbs of taro are then attached to both bows as an offering to the Taro Spirit who will guide it safely over the waters. Note the grotesque figureheads.



Photograph by Captain Frank Hurley

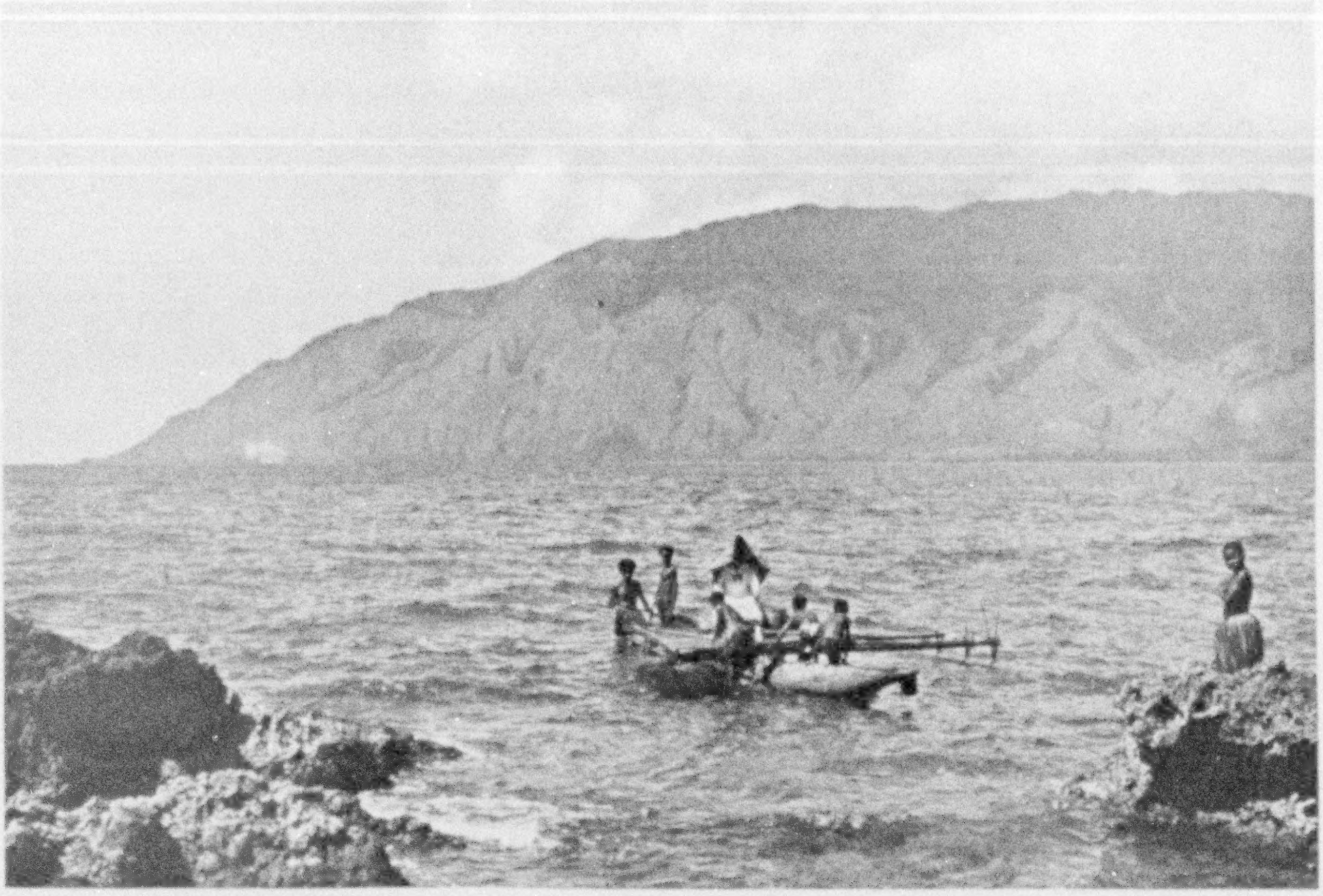
A ROCK-FRAMED VIEW OF MAILU VILLAGE

The houses of Mailu rise from the island's sandy beach like huge beehives raised on piles. In each hut reside all the living generations of the male line of a family, with their wives and children. These natives bathe frequently, but are probably actuated more by a desire to keep cool than through any appreciation of the virtues of cleanliness.

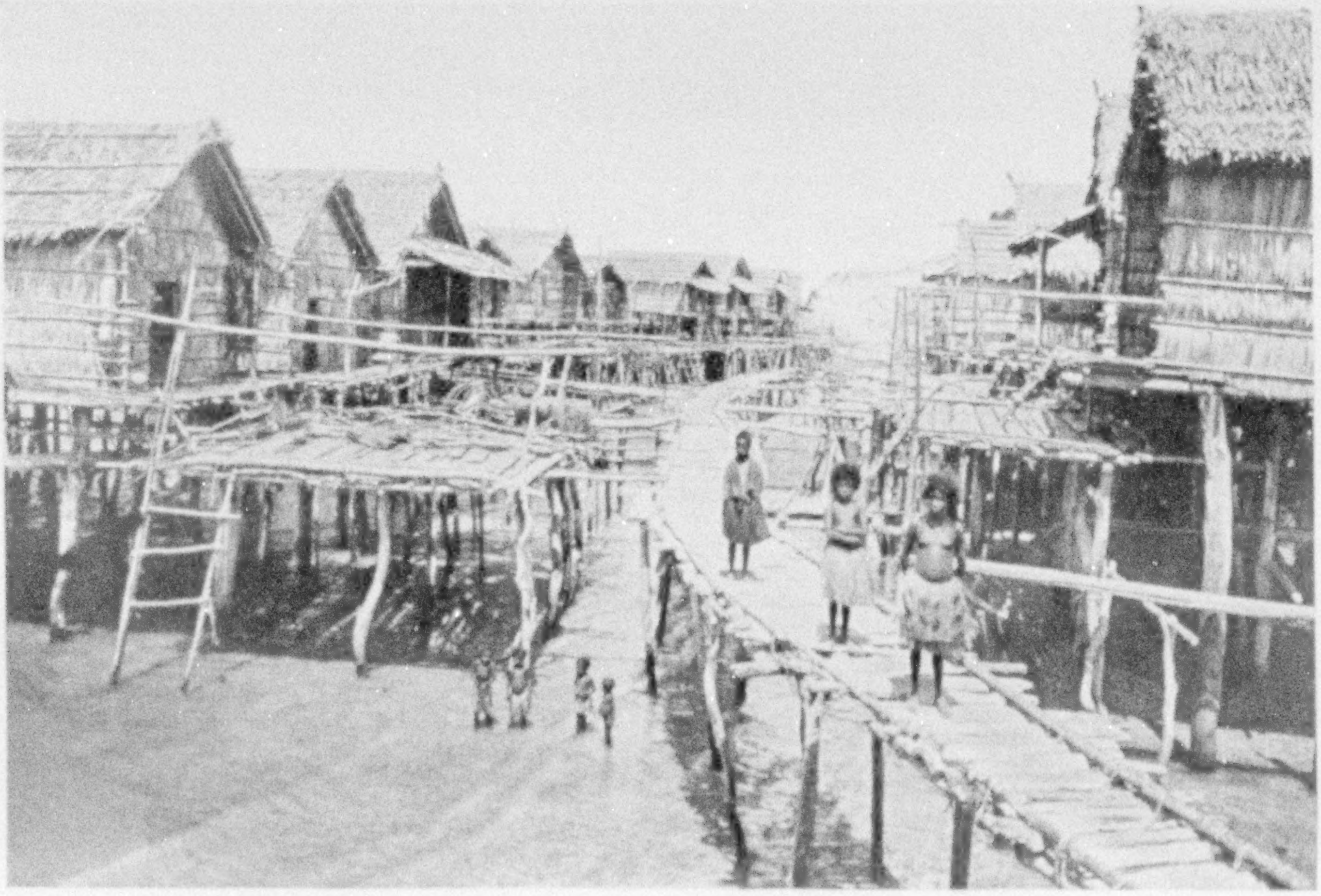
Photograph by Captain Frank Hurley

OFF THE SHORES OF SAIBAI: CAPTAIN FRANK HURLEY'S DINGHY IN THE SUNSET-DAPPLED WATERS OF THE GULF OF PAPUA

Cook's scrupulous care to take no credit that was not his due is illustrated in his comment, after his return to England, about his arduous voyage through the Torres Strait, which connects the Arafura Sea with the Gulf of Papua. He then learned what he, and the world at large, did not know when he set out, that there was a possibility that the log of Luis Vaes de Torres, lost for nearly two centuries, contained information that the latter had sailed through the Strait that now bears his name. Cook, therefore, wrote, in regard to the separate insularity of New Guinea and Australia, "I claim no other merit than the clearing up of a doubtful point."



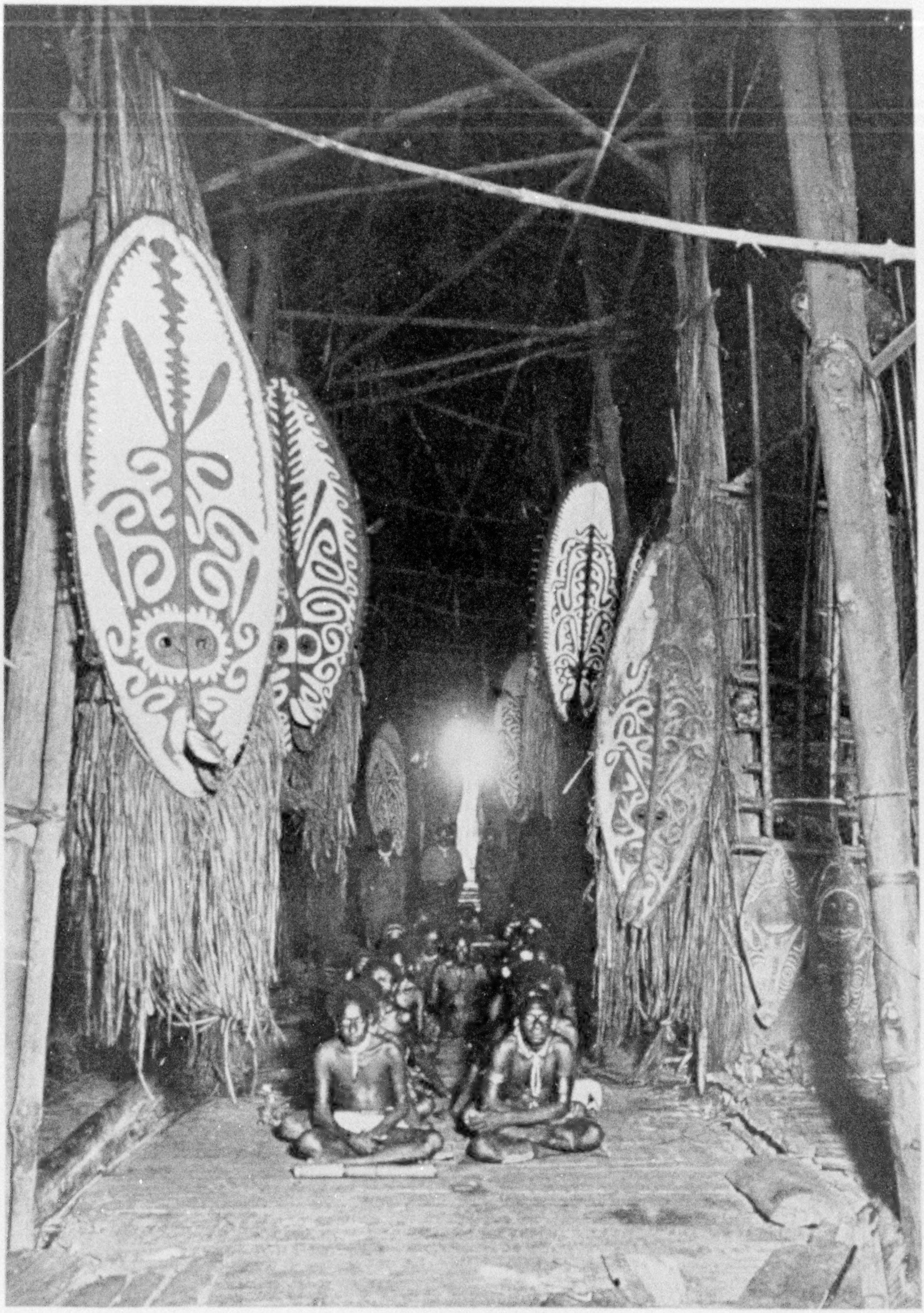
PAPUAN TARS ON THE BAY OF BOANAI



Photographs by Captain Frank Hurley

PROMENADING THE BOARDWALK IN THE NATIVE QUARTER OF PORT MORESBY

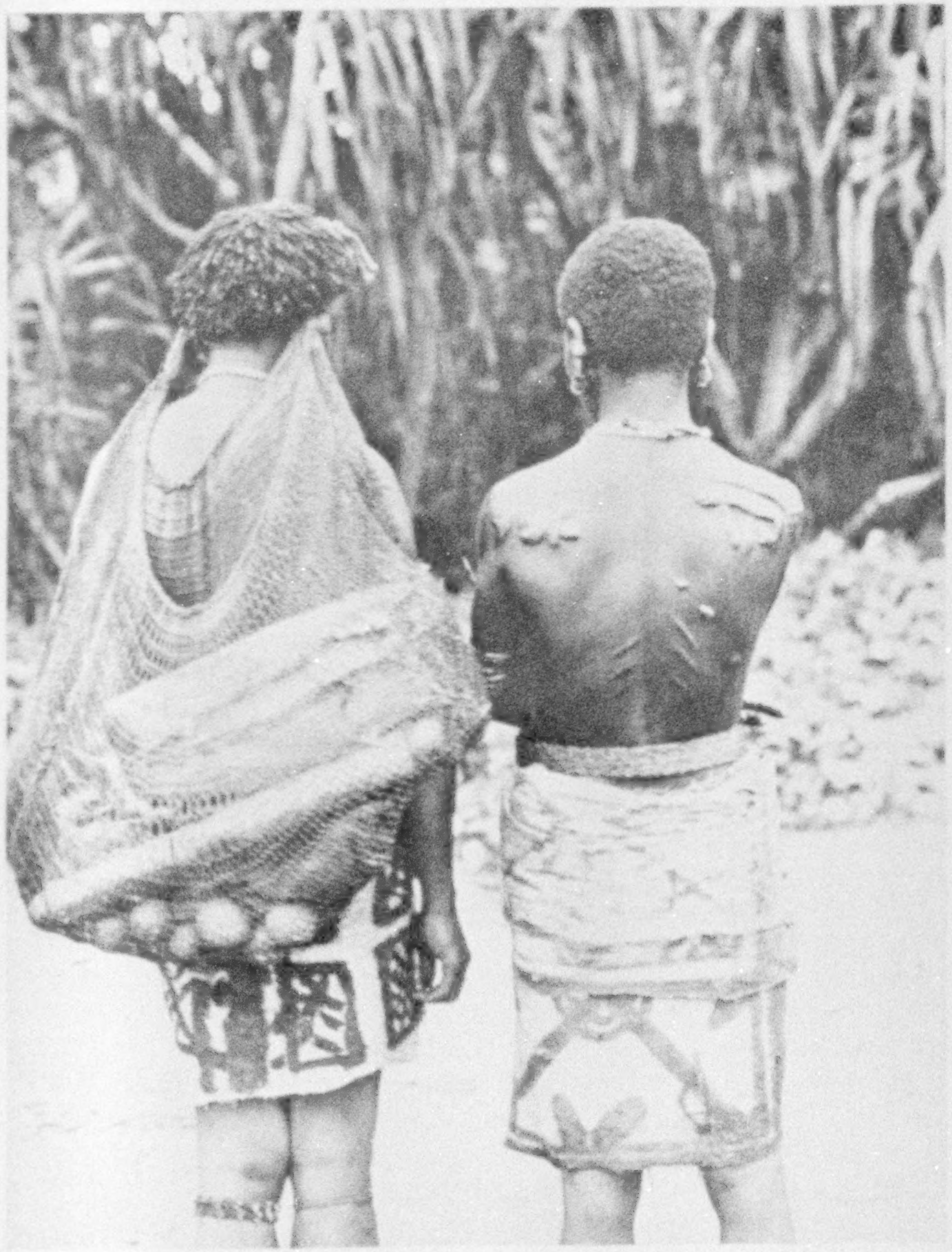
The village of Tanobada is a suburb of Port Moresby, the administrative headquarters of British New Guinea. It is built entirely on piles above the water and mud. Pigs, dogs, and human beings all live in the same houses in most amiable, if somewhat odoriferous, proximity to one another. The mud and slime below furnish "pasture" for pigs and children and a producing area for crabs.

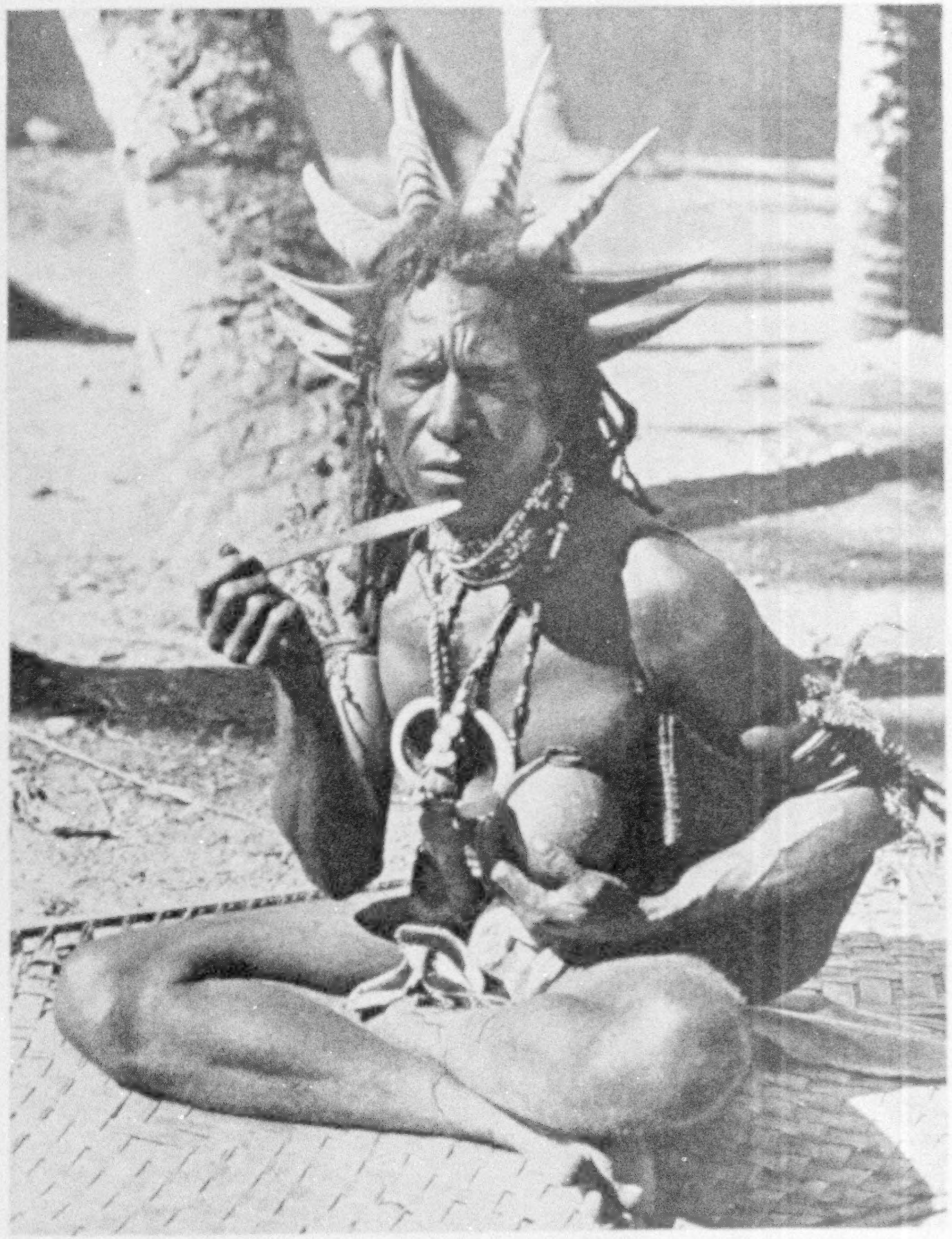


Photograph by Captain Frank Hurley

AN INTERIOR VIEW OF A DUBU, OR CLUBHOUSE

A large vestibule, which serves also as an assembly chamber, is hung with huge masks, shields, weapons, etc. A wide hallway extends the length of the building, and from either side small compartments open, each containing a skull-rack and *gopes* (decorative shields). The size and location of the compartment assigned each warrior are regulated by the number of skulls he possesses (see, also, illustrations, pages 122 and 124).





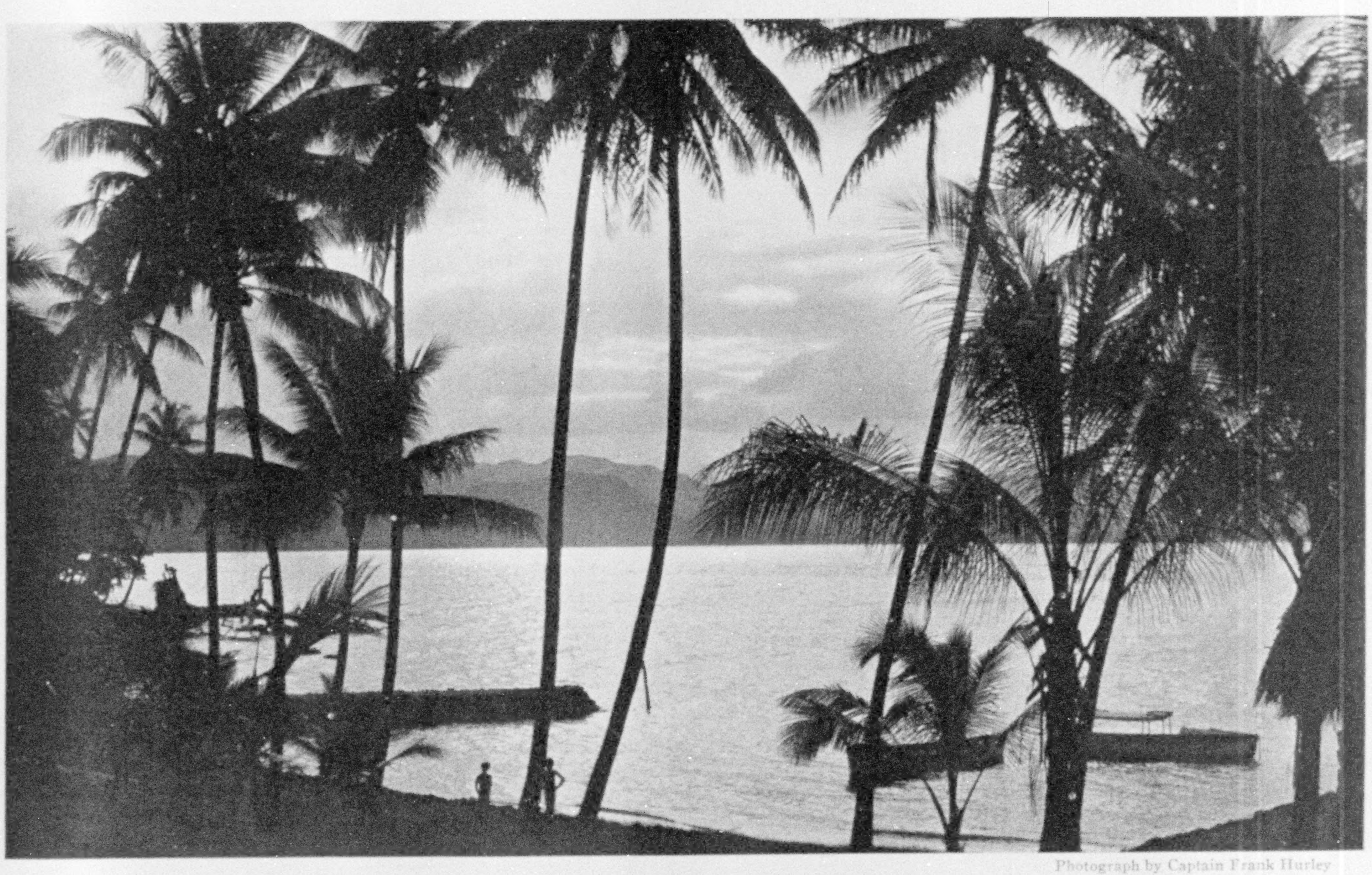
Photographs by Captain Frank Hurley

A NEW GUINEA VERSION OF THE SHOPPING BAG

The homely net reticule of civilized countries may not have originated in New Guinea, but at least its manifold uses and advantages are known and appreciated there. The Papuan woman carries everything in it, from sweet potatoes to twins, sustaining the weight by means of a band about her forehead. The cicatrices on the back of the woman to the right are indications of mourning for the death of a brother.

A CHEWER OF THE SOPORIFIC BETEL

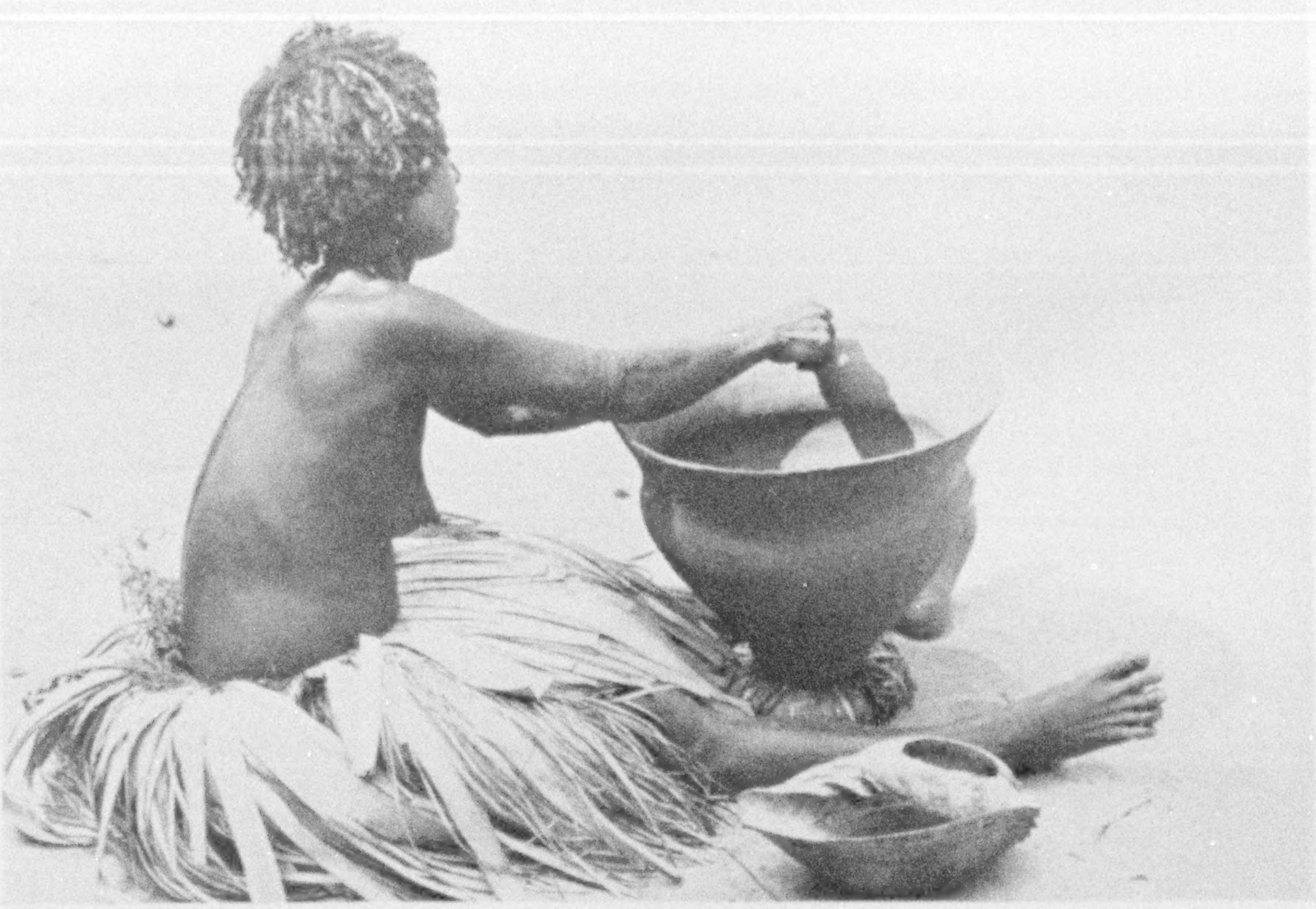
The Papuans are not addicted to intoxicants, but the habit of betel chewing is extensively practiced. The betel nut is the fruit of the arica palm tree, and when chewed along with a bit of wild pepper to provide a "kick," and some lime to produce the proper chemical action, it has a slightly narcotic effect. A small lime pot with a stick to dip in it and suck are the betel chewer's "makings."



Photograph by Captain Frank Hurley

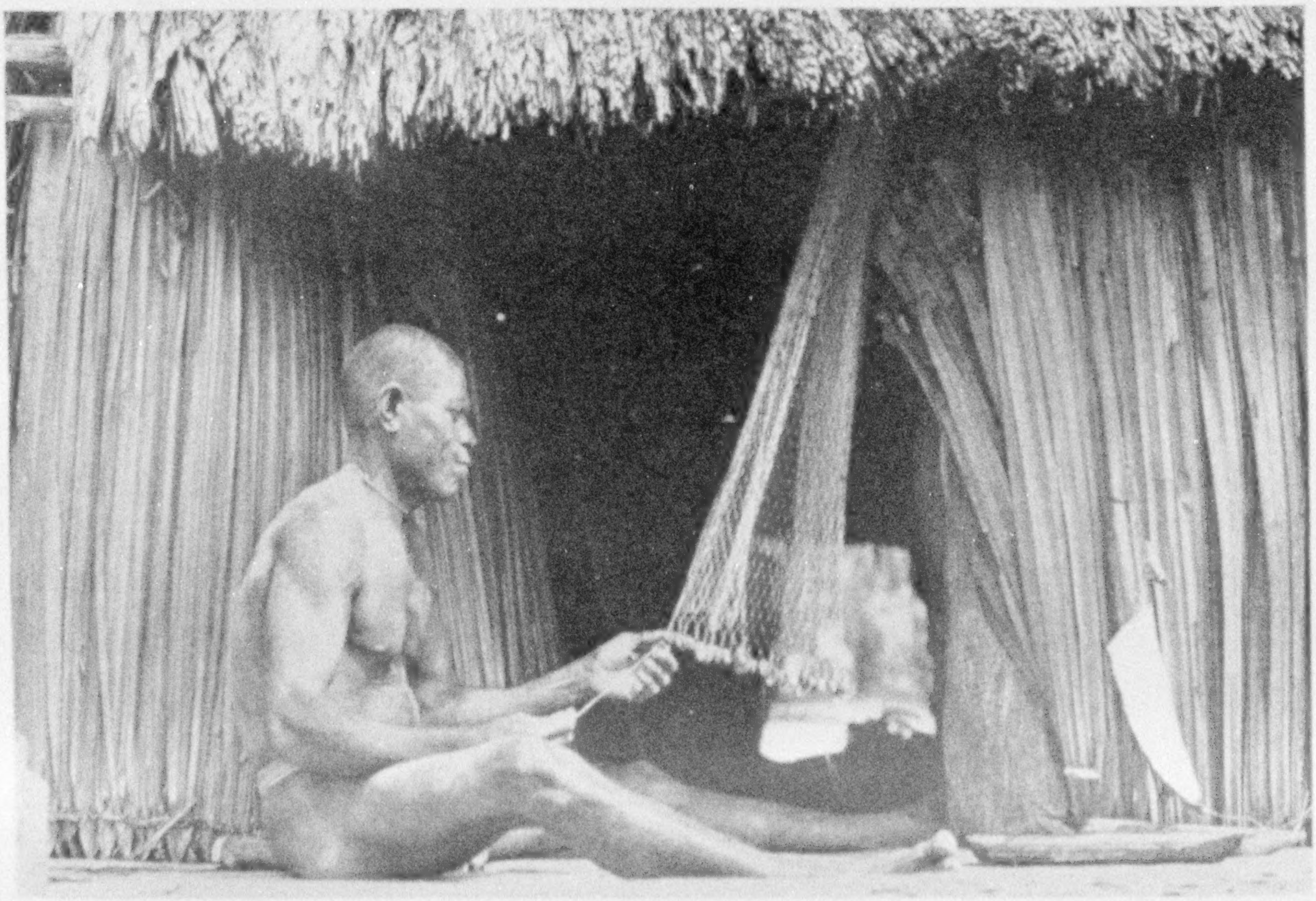
BOANAI, WHERE MISSION BELLS PEAL SOFTLY OVER THE SUNSET WATERS OF THE BAY

One of the greatest difficulties encountered by missionaries and other teachers in instructing the Papuans is the language problem. Each village has its own particular dialect, and while many words are pronounced alike, they have different meanings in different places. One missionary who regularly visited two neighboring villages continually misused a word which in one place denoted the Holy Spirit, but in the other meant sweet potatoes.



PUTTING THE FINISHING TOUCHES ON A COOK POT

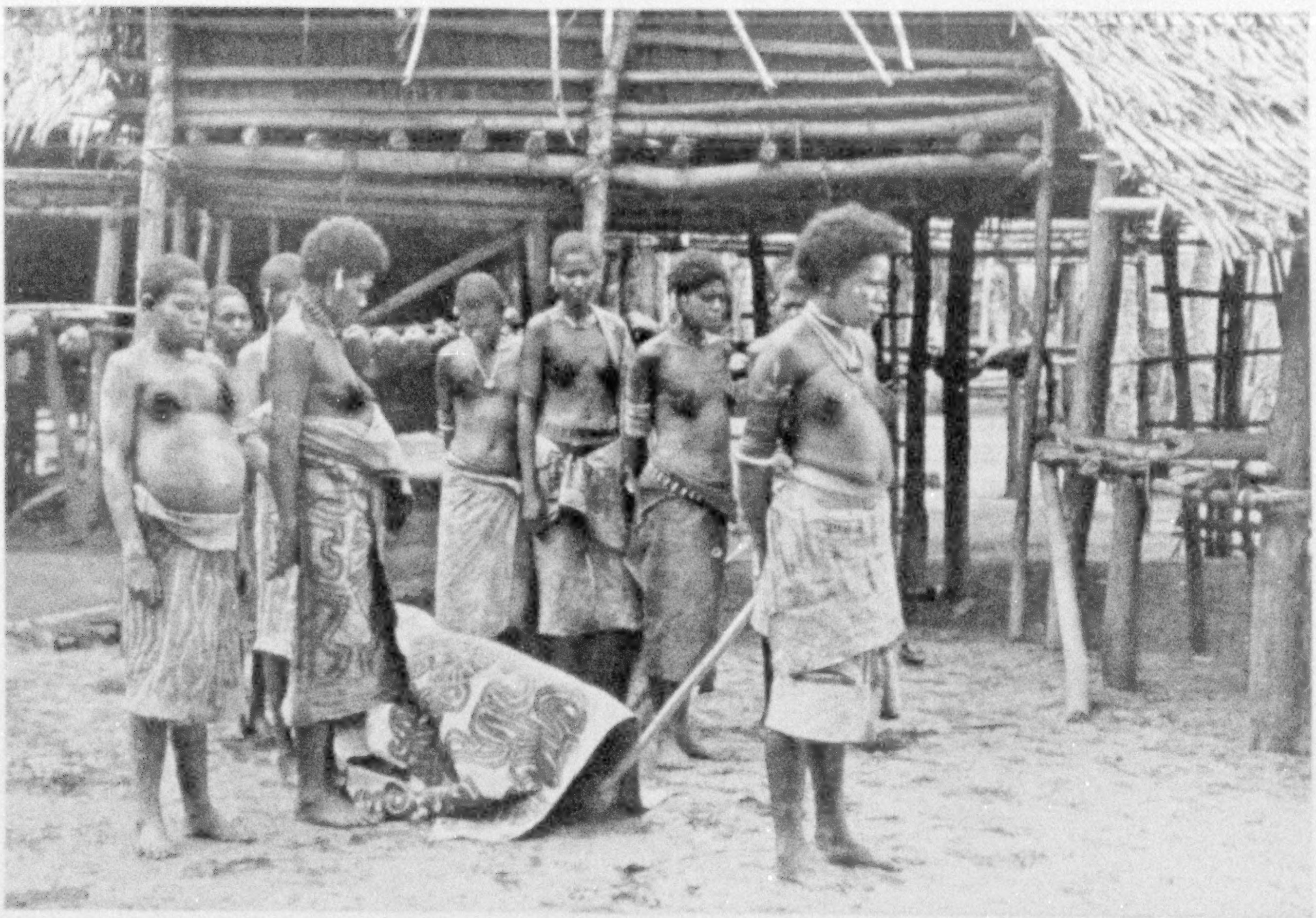
After the vessel has been built up of long, snakelike coils of clay, it is smoothed into a symmetrical shape and then baked in a fire of coconut fiber and bark. The women of Mailu (see, also, illustrations, pages 110 and 112) and Hanauabada are among New Guinea's most skillful potters.



Photographs by Captain Frank Hurley

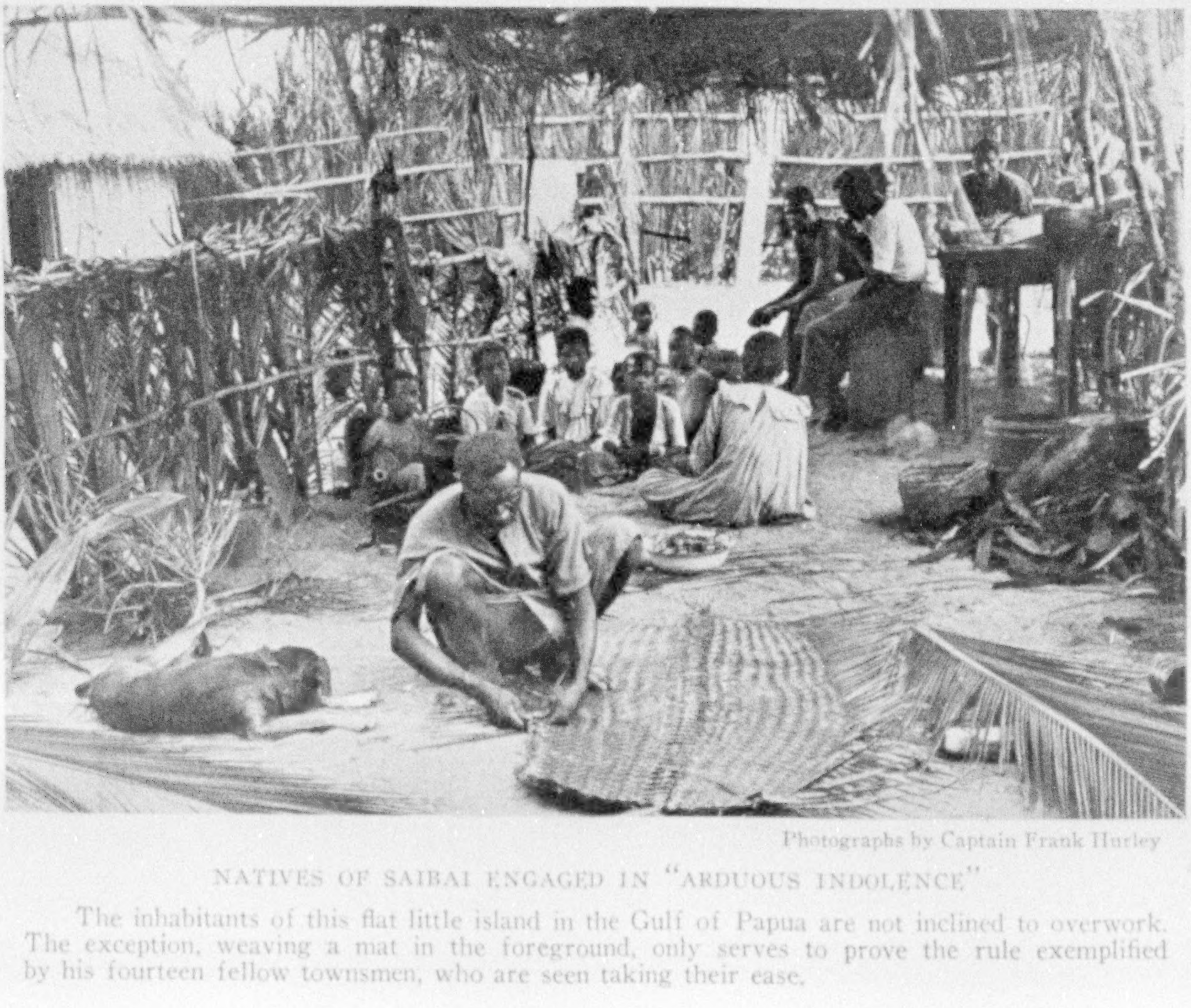
MAKING NETS FROM PALM FIBER

There is a difference of opinion regarding the ethnological affinities of the Papuans, but they have many negroid features. Tall and well built, they vary in color from dusky brown to deepest black. A prominent nose, a high, narrow forehead, and an oval face are characteristic.



A MOURNING CEREMONY IN WANIGELLA

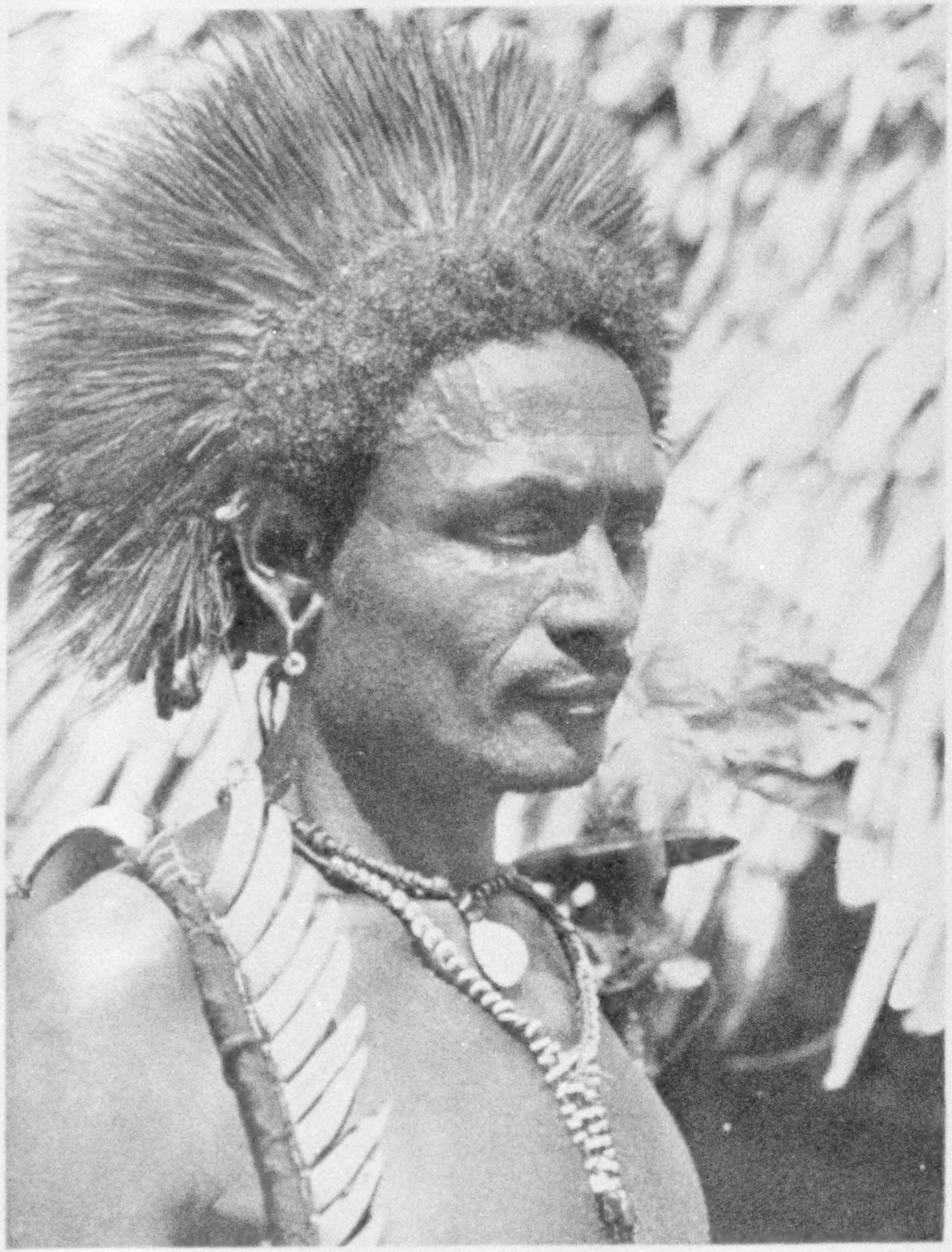
The object on the ground, enveloped in tapa cloth, is a widow. For a week she crawls at daybreak to her husband's grave, following the trail of a spear drawn before her by a friend; each evening she crawls back to an inclosure beneath her house, which she must not enter until the week has elapsed.

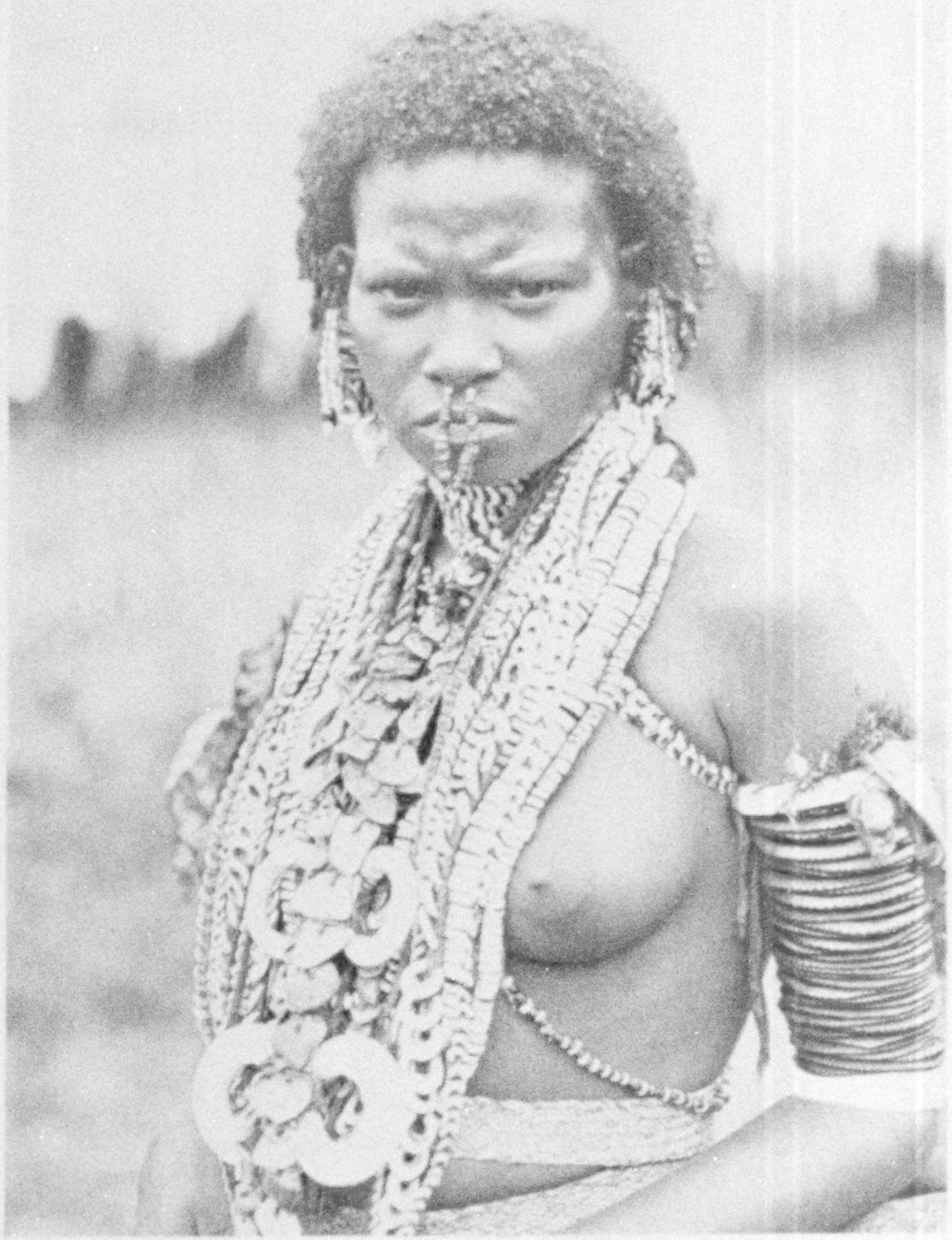


Photographs by Captain Frank Hurley

NATIVES OF SAIBAI ENGAGED IN "ARDUOUS INDOLENCE"

The inhabitants of this flat little island in the Gulf of Papua are not inclined to overwork. The exception, weaving a mat in the foreground, only serves to prove the rule exemplified by his fourteen fellow townsmen, who are seen taking their ease.





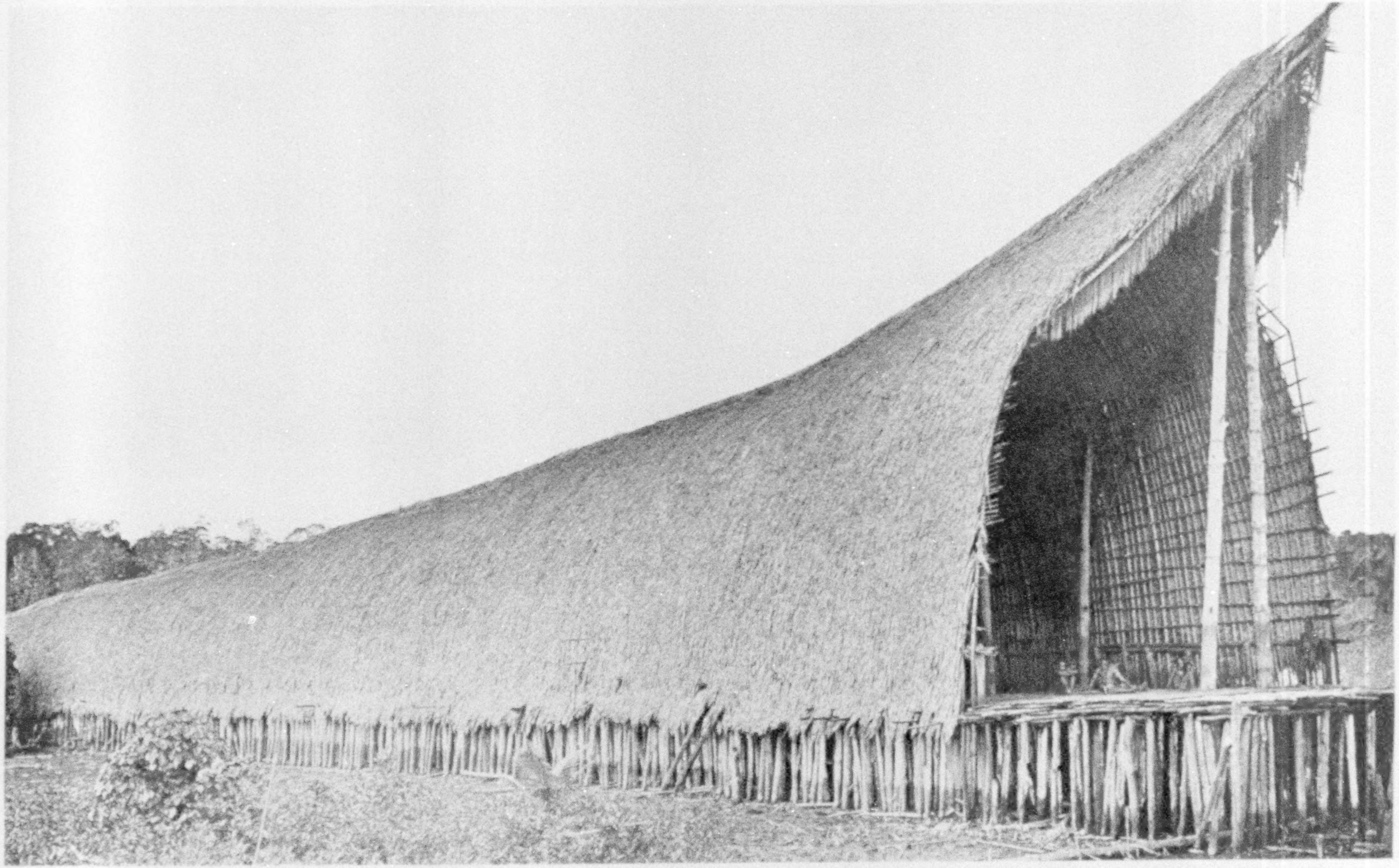
Photographs by Captain Frank Hurley

THE WANIGELLA BEAU EMULATES THE FRETFUL PORCUPINE

Incessant saturations of coconut oil and accumulations of dirt make the male coiffure a stiff, grimy mop, not unlike a clump of small black stalagmites. Frequently a piece of palm fiber is knotted onto the end of each curl, producing the bizarre effect seen here. When the owner of such a hirsute masterpiece wishes to rest he props his head up on a tiny wooden pillow.

A PAPUAN HEIRESS DISPLAYING THE FAMILY JEWELS

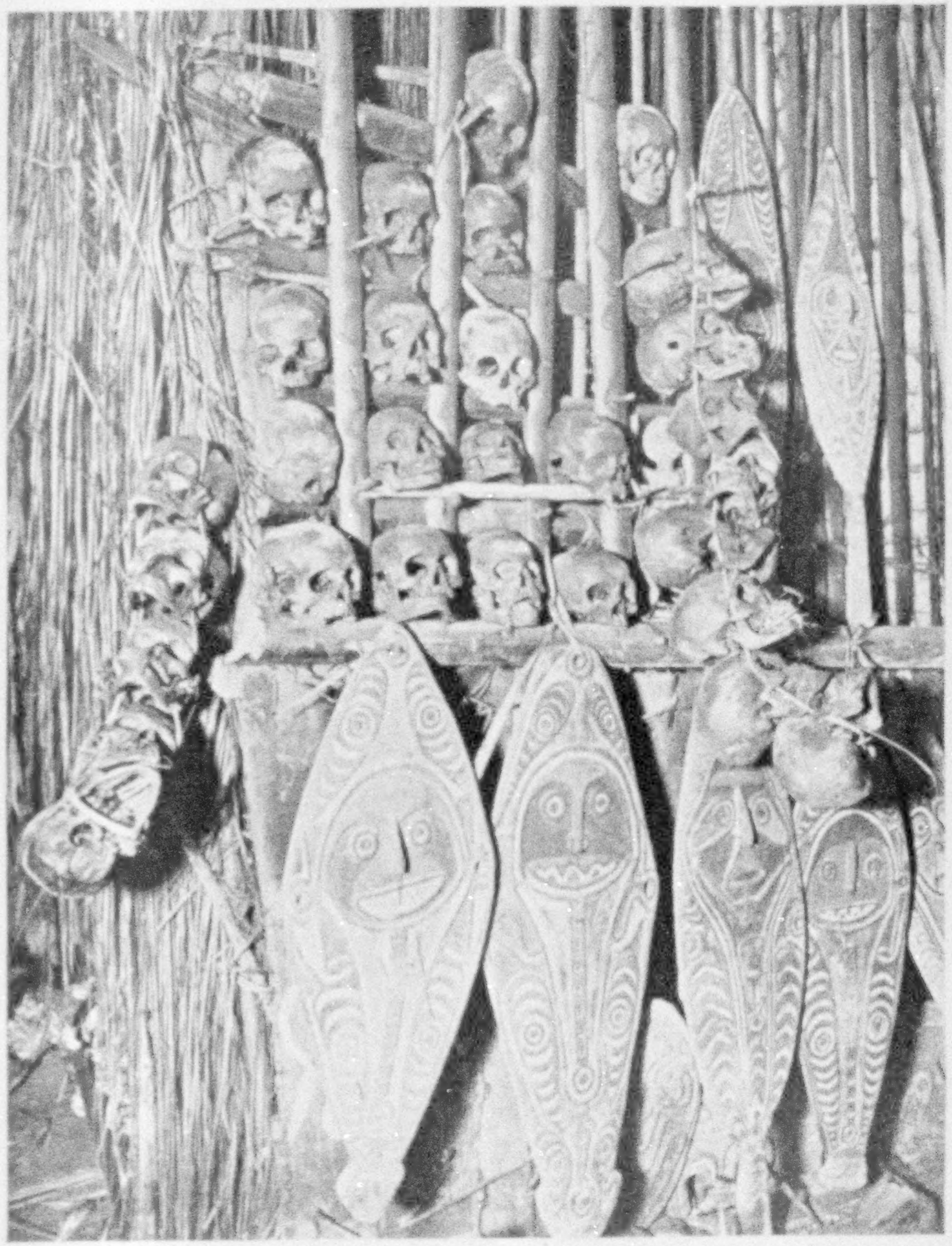
Love of personal adornment is characteristic of both the men and women of New Guinea. Necklaces, armlets, and earrings of shells, teeth, or bone, as well as feather decorations, are much in evidence. They are family heirlooms passed on through the unmarried generations and discarded after marriage. A gay feather, a flower, or a string of shells is commonly worn through a hole in the septum of the nose.

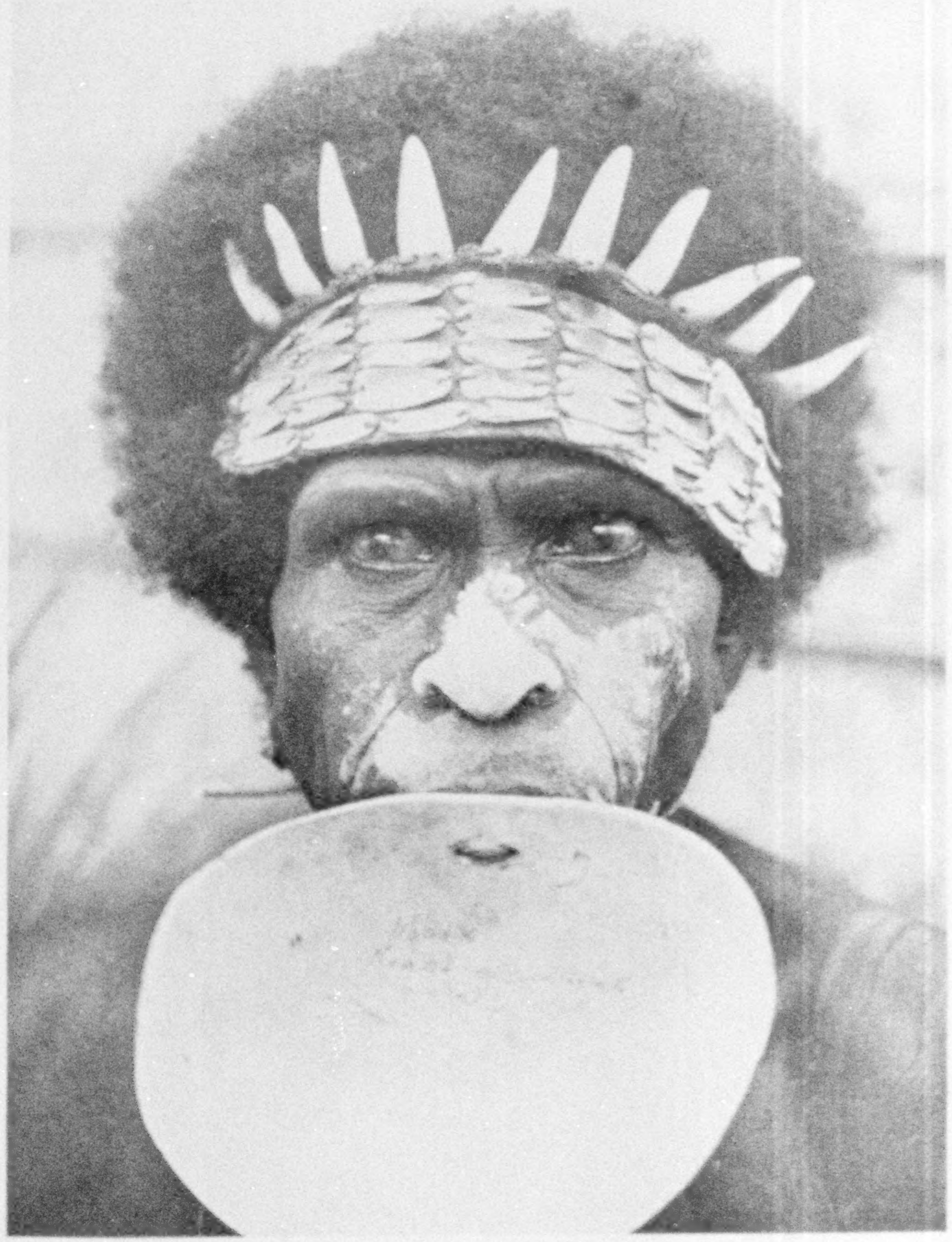


Photograph by Captain Frank Hurley

HEADQUARTERS OF A LOCAL CHAPTER OF THE FRATERNITY OF PAPUAN HUSBANDS

In some of the New Guinea villages small huts are built as living quarters for the women and children, while the married men dwell in a great clubhouse known as a *dubu* (see, also, illustrations, pages 109 and 124). This one is more than 400 feet long and its vast arched entrance towers 60 feet above the floor. The structure is built of palm thatch over a framework of poles and is raised on piles 10 feet above the muddy flat.





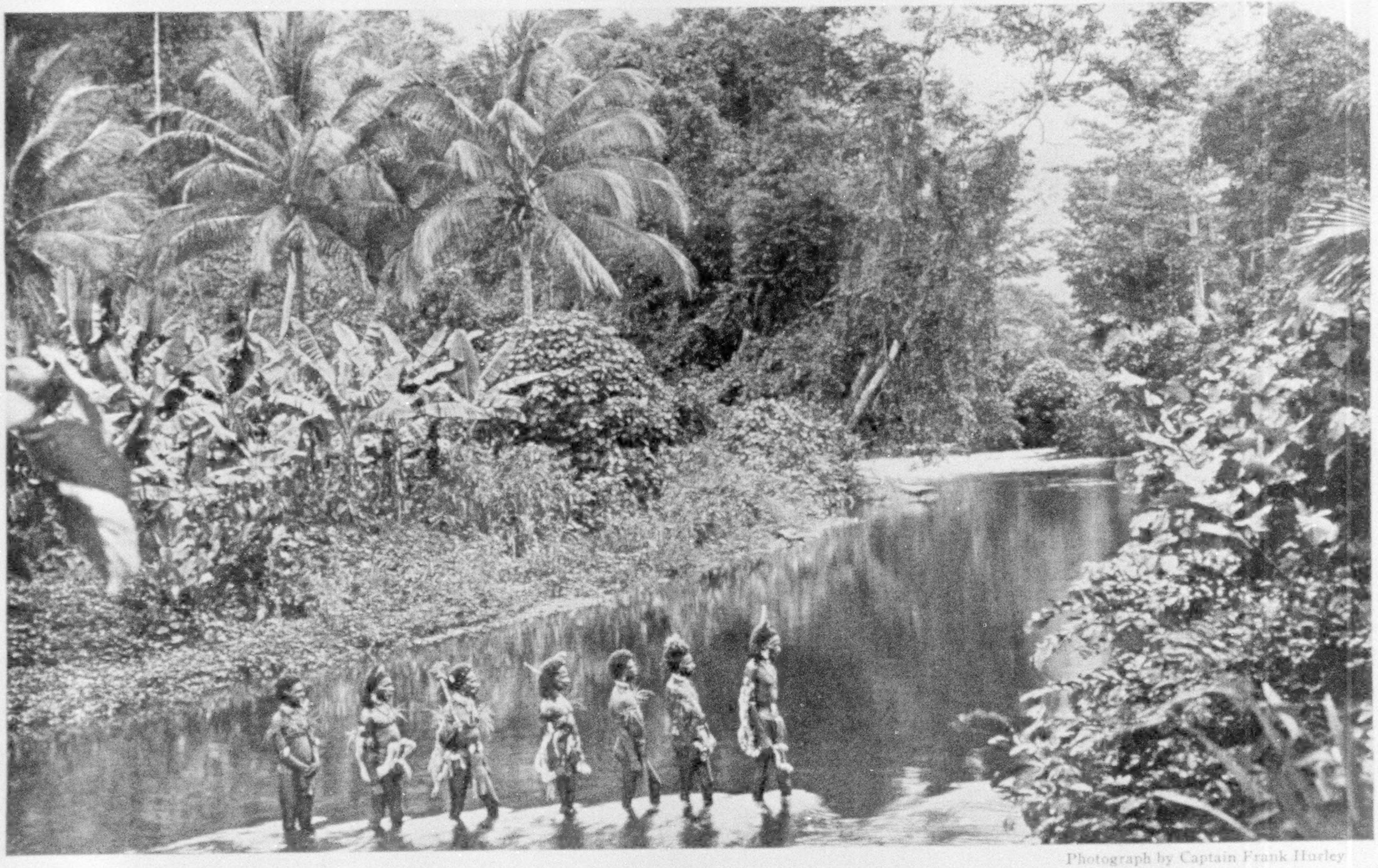
Photographs by Captain Frank Hurley

A SKULL RACK IN A DUBU DAIMA

A warrior's social standing in his tribe is largely determined by the number of these gruesome relics he inherits from his father. Each skull represents a victim killed and eaten, and the gopes, or shieldlike images hanging below, represent the ancestral spirits of the owner. As long as these keep watch, the spirits of the victims are enslaved and can do no harm (see, also, illustration, page 115).

A CANNIBAL DANDY OF COIRA

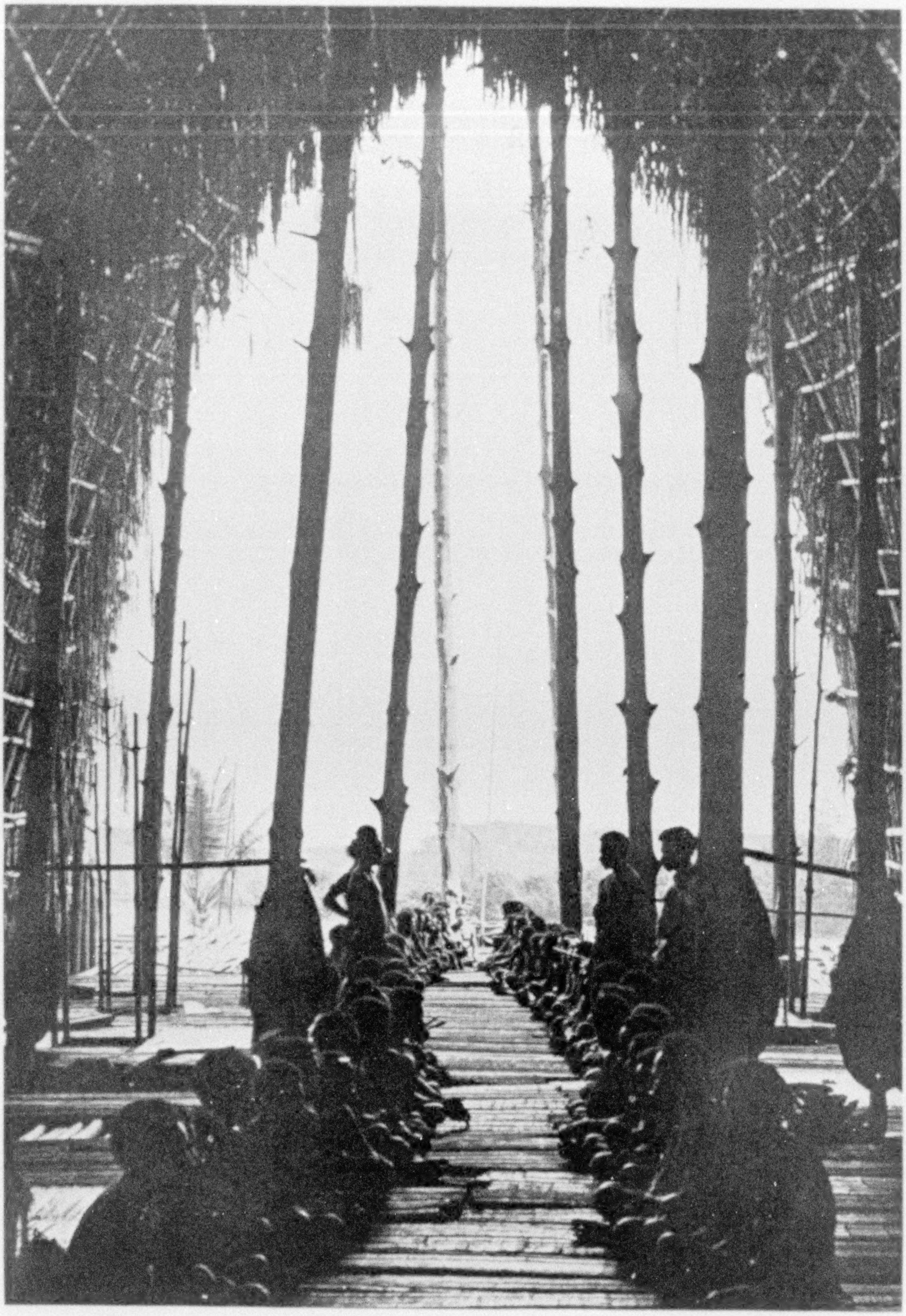
The inland village in which this erstwhile "man-eater" lives has been described as a "dreamland of nightmares," where the inhabitants sleep most of the day and come out at night to thump their drums and thus drive away the malignant spirits of their dead. This gentleman is impelled by vanity to wear the huge shell lip disk and the headband of similar material.



Photograph by Captain Frank Hurley

A GLIMPSE OF TROPICAL LUXURIANCE IN THE AWANEN VALLEY

Canopies of stately palm trees, cascades of green vines that in some places create the impression of a solid wall of verdure; festoons of creepers, clusters of gigantic ferns, and the brilliant hues of orchids and other blooming plants make one's progress up a Papuan river like a visit to the fabled realms of fairyland. At one point along New Guinea's coast the sailors of Captain Cook's *Endeavour* saw coconut trees and wished to go ashore. The explorer's humane treatment of the natives was exemplified by his refusing permission. He said that natives would be killed in the fighting that was certain to ensue, and he did not wish to sacrifice human lives for coconuts.



Photograph by Captain Frank Hurley

THE RECEPTION COMMITTEE AT THE ENTRANCE TO A CANNIBAL SANCTUARY

While British administration has forced the native tribes of New Guinea to abandon the practice of cannibalism, they still retain many of the ritualistic ceremonies that accompanied it. The *puripuri* (magic) with which they celebrated their human feasts is still performed to keep away the evil spirits of the dead (see illustrations, pages 109 and 122). Whenever anyone falls sick, he is said to have been "bitten" by one of these wandering souls.

War it helped fight the Allies' battles because its whale oil yielded glycerin for making high explosives (see illustration, page 102).

Explorers and scientists were indignant because the Forsters published an unauthorized account of the voyage before Cook had opportunity to prepare his; but future generations are indebted to these two German landsmen for descriptions of what they term "a series of hardships never before experienced by mortal man," which Cook and his companions took very much for granted.

Sometimes, in the high latitudes, icicles more than an inch long hung from the noses of the sailors, and they were encased in frozen sleet, as if in armor, while on deck. Amid bitter cold and furious storms they worked with rigging so incrusted with ice that human hands could scarcely grasp the ropes. They sped from waterspouts, and they gazed in awe on the Southern Lights, so brilliant that one might read on deck.

"DREADFUL ENERGY" OF SEAMEN'S LANGUAGE UPSETS SCIENTISTS

Through all this the sailors were cheerful and well, though the Forsters find themselves upset by "the dreadful energy of their language."

Cook himself, on this trip, was near death, and in his convalescence he relates: "A favourite dog fell a sacrifice to my tender stomach; and I could eat of this flesh, as well as broth made of it, when I could taste nothing else."

The major result of the voyage was to prove that no Antarctic land extended to habitable latitudes, nor, indeed, into vast areas of the Antarctic Ocean where only hardy mariners would venture.* In demonstrating that fact, Cook circumnavigated the globe within, or near, the Antarctic Circle, and cruised about the southern waters of both hemispheres, running over a greater length of sea than any navigator had sailed before.

Other fruits of this voyage are described by the Forsters:

> We made another discovery important to science, that Nature forms great masses of ice in the midst of the wide ocean, which are destitute of any saline particles, but have all the useful and salubrious properties of the pure element. At other seasons we explored the Pacific Ocean between the tropics and the temperate zone, and then furnished geographers with new islands (including the Cook and Palliser groups), naturalists with plants and birds, and, above all, the friends of mankind with various modifications of human nature.

In doing all this Cook lost only four men, three by accident and one from disease.

When the great navigator came back from his second voyage he was acclaimed as one "who had done for geography and seamanship more in his voyages than any other man since Columbus." The Admiralty made the one-time collier's ship boy a post-captain, the Royal Society elected him to a fellowship and requested from him two scientific papers. For the one on the preservation of the health of his crew it bestowed its gold medal.

The exhibit that Cook brought home from his second voyage, which eclipsed all others in popular interest, was Omai, a native whom Captain Furneaux had taken aboard in the Society Islands. He was the first South Sea Islander to set foot on the shores of Britain and few savages in all history won such fame.

Cowper wrote verses to him, Reynolds painted him, the garrulous Dr. Johnson dined with him.

Omai was the season's novelty in London drawing-rooms, but he remained impervious to all the ways of civilization except one—he developed amazing proficiency in the game of chess.

On his third voyage Cook took him back to his homeland and left him. The Englishmen built him a house, gave him kettles and pans, a horse and a mare, made him a garden and planted seeds—all of which he neglected for the delight of playing a hand organ day in and day out to admiring crowds of homefolk.

But that is getting ahead of the story.

COOK VOLUNTEERS FOR THE NORTHWEST PASSAGE

As one of the evidences of his country's appreciation of his achievements, Cook was given the assignment of captain of hospital, with a view to providing him a retreat for the rest of his life. Then he

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* See, also, "Sailing the Seven Seas in the Interest of Science," in the NATIONAL GEOGRAPHIC MAGAZINE for December, 1922.

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AN OUTRIGGER CANOE OF THE SANTA CRUZ ISLANDS

The size, speed, and variety of vessels developed by natives of the South Seas amazed Captain Cook. Some were as large as his own vessel; others were as light as an Eskimo kayak. The outrigger canoes, seemingly fragile, negotiate long distances, make good speed when equipped with sails, and are safe, even in rough seas.

went to dinner one day with Lord Sandwich, where his counsel was asked about a leader for the renewed search for the Northwest Passage. He impulsively volunteered to undertake the work himself, and was off again!

For years navigators had been plunging into the hostile North Atlantic to find a short route to China, only to be frustrated by fog, shipwreck, storms and ice. The plan of Cook and his sponsors was to attack the barrier from the Pacific side.

The *Resolution,* again chosen by the leader, put out of Plymouth on July 11, 1776, to be followed by the *Discovery,* a 300-ton vessel commanded by Captain Clerke.

They rounded the Cape of Good Hope, touched at Crozet Islands and Kerguelen, desolate then and now nicknamed the Land of Desolation, and named Christmas harbor for the Christmas day spent there.

After touching at New Zealand for supplies, Cook discovered a small island, Mangaia, of the group subsequently named for him. A native came aboard, stumbled over a goat, and asked what kind of bird it was.

HOW THE SOUTH SEA ISLANDS WERE PEOPLED

Among the natives appeared three countrymen of Omai's. They proved to be the sole survivors of some twenty Tahitians who, while paddling toward another of the Society Islands, had been driven more than 600 miles off their course to Mangaia's shores. Cook observed that this incident shows "better than a thousand conjectures of speculative reasoners" how the remote islands of the South Seas were peopled.

It is hard to judge which the *Resolution's* crew enjoyed more, the sumptuous fare of fish and coconuts they found at Palmerston Island or the unusual entertainment provided on the Hapai Islands, where wrestling and boxing matches were staged for the visitors, and suddenly "a couple of lusty wenches stepped forth and began boxing with as much art as the men."

© Lomen Brothers

HOW THE ESKIMO HUNTS FOR FOOD

The woman, with her baby on her back, is fishing through the ice for crabs. This scene was caught by the camera in Bering Sea off the coast of Nome.

Everywhere Cook had trouble with native thieves, but the Tonga, or Friendly Islanders, were exceptionally light-fingered. When their chiefs were appealed to, they nonchalantly advised the Englishmen, in effect, "to catch the thieves and kill them." Cook was averse to any extreme measures. Once in a fit of anger he cut off the ears of a marauder and regretted his severity. He put an effectual stop to the raids of the Tonga Islanders by shaving the heads of the depredators. Flogging had no effect, but the ridicule heaped upon the hairless culprits by their countrymen worked wonders upon the entire native population.

On Tongatabu, largest of the Tongas, Cook encountered a picturesque monarch. This dignitary took a particular fancy to the ship's pewter plates and, upon obtaining one, explained why he wanted it.

Always, when he left the main island to visit his outlying domain, he designated a wooden bowl which, during his absence, was to be paid the same obeisance as that accorded his own person and which also was to serve at his trials by ordeal. When a crime was committed and the offender was unknown the people were summoned, one by one, to touch this bowl. Should the guilty man touch the sacred vessel Providence would deal him instant death; if he refused he was adjudged guilty. His Majesty desired the pewter plate to replace his wooden bowl.

TONGA ISLANDERS ANTICIPATE CHIROPRACTIC SKILL

In return for this gift and other courtesies Cook was tendered the services of the regal sleep-producing squad. When the king was wakeful his attendants were required to roll him over on his stomach and beat a gentle tattoo up and down his spinal column. Cook admits that it would seem this procedure would have an opposite effect, but testifies, after trying it, that it created "a very agreeable and pleasing sensation."

Then Tahiti again, the island that set the words flowing in every diary and journal and notebook. To conserve his

Photograph by George R. King

AN ESKIMO IN HIS KAYAK: NOME REGION OF ALASKA

Cook described Alaskan natives as a thickset, good-looking people, whose appearance and speech were widely different from those he encountered at Nootka Sound, Vancouver Island. He told also how their boats were made of skins stretched over a wooden frame, like those of the Greenlanders—another example of Cook's shrewd observations, in line with Dr. Knud Rasmussen's conclusion, that the Eskimos of Greenland and Alaska had a common origin in the interior of Canada.

ship's supply of spirits, Cook persuaded the men to drink a coconut concoction and issued an order to stop "serving grog, except on Saturday nights, when they had full allowance to drink to their female friends in England, lest among the pretty girls of Otaheite they should be wholly forgotten."

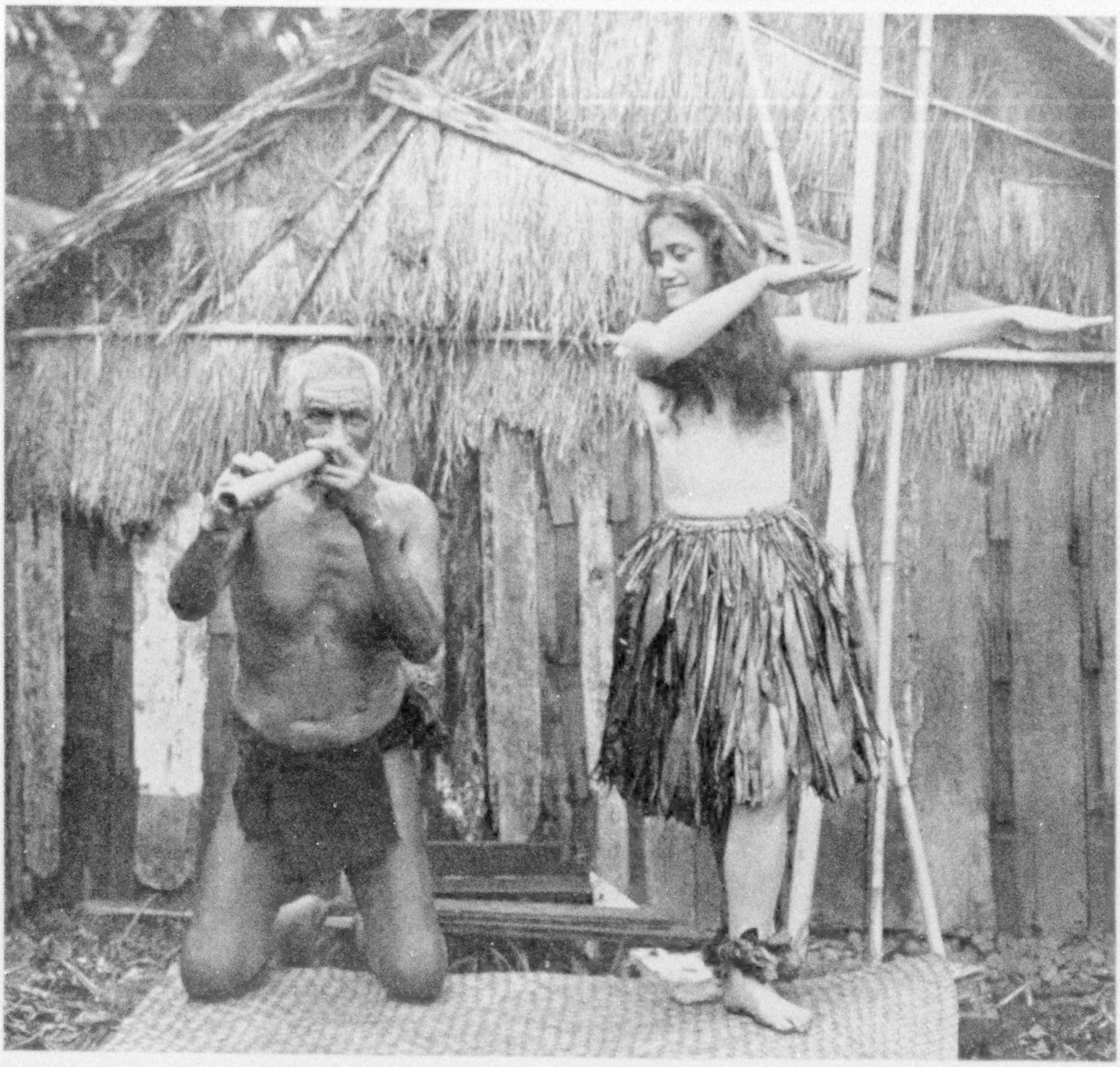
Here he encountered a more vigorous form of chiropractic treatment than the gentle backbone thrumming of the Tonga servitors. He had a touch of rheumatism and "I was desired," he wrote, "to lay myself down. Then as many of them as could get around me began to squeeze me with both hands, from head to foot, but more particularly on the parts where the pain was lodged, till they made my bones crack, and my flesh became a perfect mummy.

"After undergoing this discipline about a quarter of an hour, I was glad to get away from them. However, the operation gave me immediate relief, which encouraged me to another rubbing-down before I went to bed; and it was so effectual that I found myself pretty easy all the night after."

Goats that had been left at Tahiti on a previous visit had increased; so further contributions of peacocks, turkeys, chickens, geese, and cows were made. Some of these creatures came all the way from England and others were taken on at the Cape of Good Hope.

Cook's previous visits had only whetted his appetite for further observations. His notes now ranged from the technique of human sacrifices offered to island gods to a recipe for a native pudding made from breadfruit, plantain and pandanus fruit, and a detailed description of a voluminous native dress, with a sort of "circular hooped petticoat."

Heading to the north, the explorers celebrated their second Christmas out by naming a tiny guano island for the holiday. The next land they sighted was Kauai, an island of the Hawaiian group; Hawaii itself, however, was not visited until the eventful and fateful landings of the return voyage.



Photograph by Dr. Henry W. Henshaw

COOK HAD NO PHOTOGRAPHER TO PROVE HE HAD SEEN SUCH PERFORMANCES

Accounts of nose flute players and dancers such as these seemed like tales from an Alice-in-Wonderland world when Cook's associates told them in London. The explorer's companions appeared no less freakish to the Hawaiians. Natives who boarded the Englishman's vessel returned to tell their friends of strange white men who had heads horned like the moon, carried fires burning in their mouths, voyaged on islands with tall trees (masts), and who when they wished anything took it out of their bodies (pockets). But, they warned, these white men ate the raw, red flesh of men; they had seen sailors enjoying a feast of watermelons brought from other islands.

The voyagers hastened on to "New Albion," skirting the shores that now are Oregon and Washington.

They put in at cross-shaped Nootka Sound, on Vancouver Island, and set up a crude observatory. Cook described the "two wooden figures" found in so many native huts, and wrote of the skins of the wolf and bear, deer, marten, fox, seal, ermine, and beaver to be had there—prophetic, indeed, of the days when the island was to have the Dominion Astrophysical Observatory, with its 72-inch reflecting telescope; when explorers of early human history were to study the totem poles of our northwest Indians; when a great company was to open up all British Columbia for the sake of its fur trade.

IN THE REGION OF LATER NATIONAL GEOGRAPHIC SOCIETY DISCOVERY

One bright day in early May, Mount St. Elias loomed up ahead.* The explorers sailed along to Prince William Sound and,

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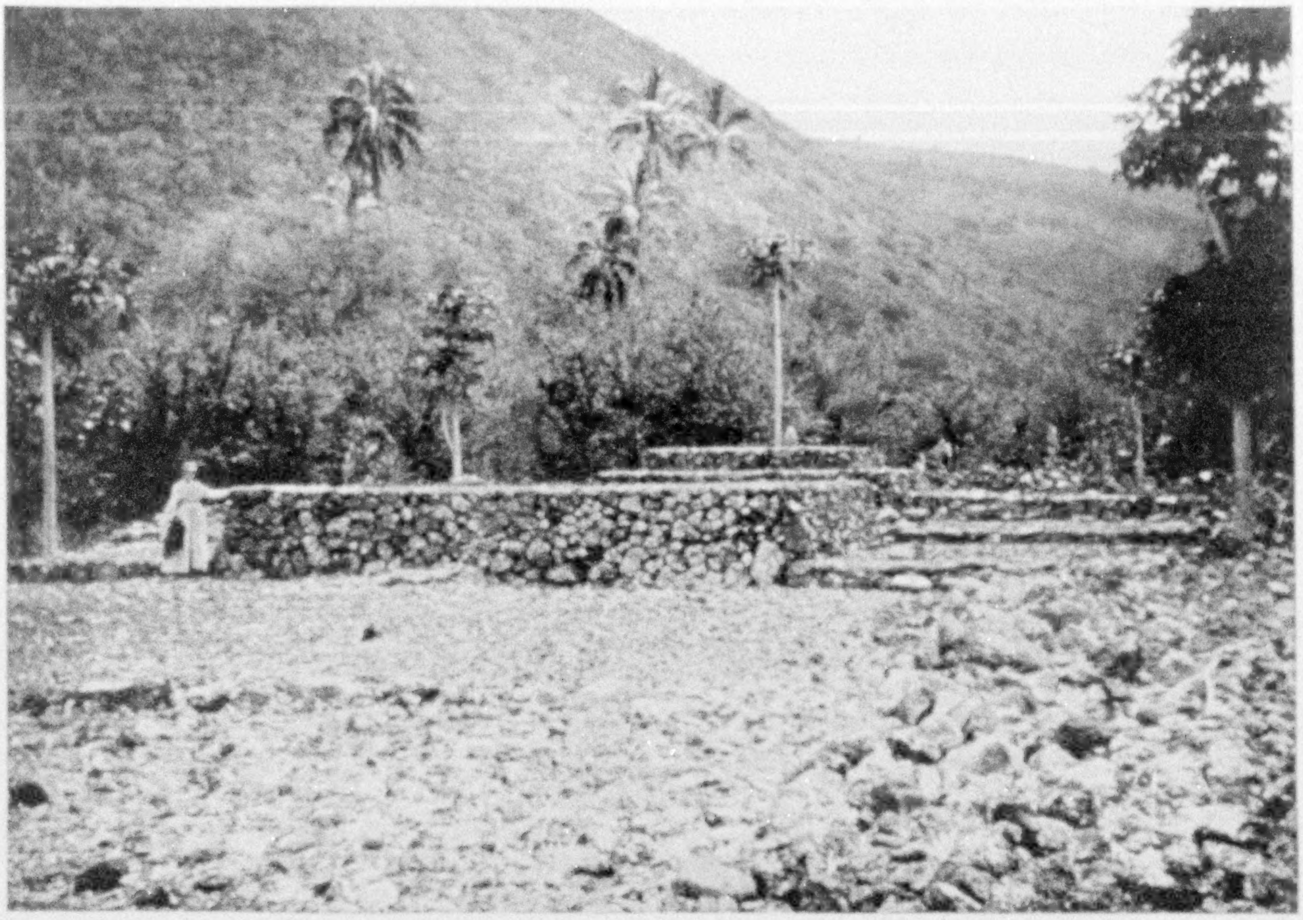
*See, also, in the NATIONAL GEOGRAPHIC MAGAZINE, "The Monarchs of Alaska," July, 1909, and "The National Geographic Society's Alaskan Expedition of 1909," January, 1910.



Photograph by Dr. Albert S. Baker

WHERE CAPTAIN COOK WAS WORSHIPED AS A GOD

This temple site at Napoopoo, Hawaii, looks down upon Kealakekua, meaning "the pathway of the gods." On his first visit to Hawaii, Cook was hailed as the deified reincarnation of a king who had sailed away years before, promising to return on an island bearing trees and swine and dogs. Cook's masted ship, with its animals aboard, seemed to fill this description (see text, page 131).

anchoring there, found a sturdy, black-haired, thickset people whose boats, Cook noted, were made of skins stretched over wooden frames like those of the Greenlanders (see illustration, page 128).

These natives had one "beauty mark" observed nowhere else—a slit through the under lip in which to insert pieces of carved bone. They sometimes produced a grotesque effect by removing the ornament and sticking their tongues through the aperture.

Cook tested out Cook Inlet as a possible passage to Hudson Bay, then sailed southwest past Kodiak Island, near which, a century and a half later, a National Geographic Society expedition discovered the Valley of Ten Thousand Smokes.* He noted the volcanic activity of the Aleutians, and encountered Russians. He explored points around the Bering Sea, visited the Siberian side, and proved how narrow is the break in the land bridge between Asia and North America.

Then he sailed back toward Hawaii, where he met some of the most remarkable experiences of his adventurous lifetime—and his death.

As the *Resolution* put into Kealakekua Bay, Hawaii, Cook was amazed at the welcome he received. Natives lined the shore, and more than a thousand canoes gathered round the ship.

His wonderment increased when he went ashore and was conducted to a native altar mound, where he became the principal, though passive, figure in an elaborate ritual.

At the culmination of the ceremony the worshipers prepared kava, a procedure that began with priests chewing pieces of coconut and rubbing them on the face and arms of the explorer. The juices of this concoction were passed around and then they fed Cook and Captain King, who accompanied him, with the flesh of the sacrificial animals.

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* See "The Valley of Ten Thousand Smokes," by Robert F. Griggs, published by the National Geographic Society. Price, $3.

"I had no great objection," wrote Captain King, "to being fed by Pareea, who was very cleanly in his person; but Captain Cook, who was served by Koah, recollecting the putrid hog (on the altar) could not swallow a morsel; and his reluctance, as may be supposed, was not diminished when the old man, according to his mode of civility, had chewed it for him."

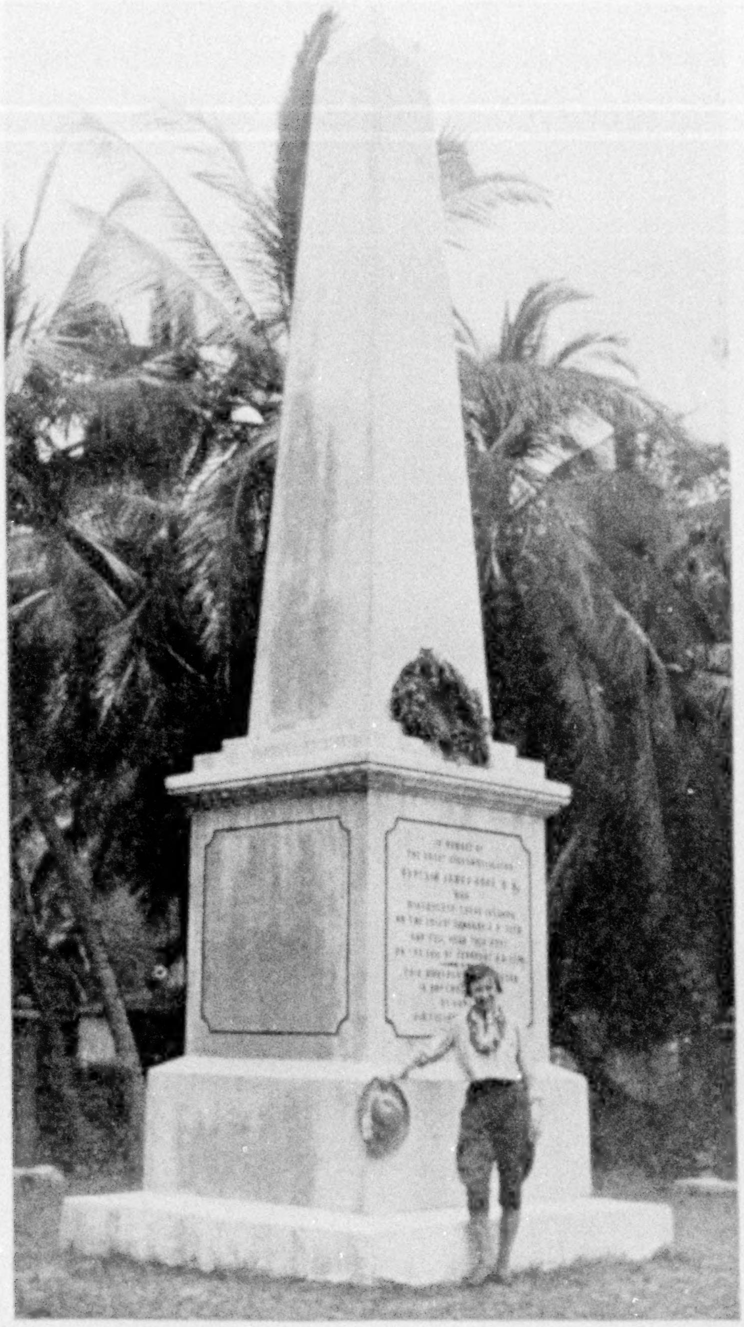
Thereafter when the visitor landed a native escort accompanied him, the people prostrated themselves before him, and presents of provisions were bestowed upon both vessels far in excess of their needs. The monarch of the island, upon first meeting Cook, removed his mantle and threw it over the leader's shoulders.

THE GOD WEARS OUT HIS WELCOME

Cook sailed away, unaware of the significance of this extraordinary hospitality. Encountering severe gales and being unable to find a better harbor, he returned again to Kealakekua, to find the natives indifferent at first, and later hostile.

The explanation of this reversal of feeling lay in the fact that the islanders construed Cook's first visit as a long expected second coming of their deity.

Once upon a time, it seemed, there had lived a god of peace and plenty named Rono. This god found his wife, the beautiful Opuna, unfaithful to him, so he flung her over a cliff. He mourned for a time, then left the island, so the legend ran, with the parting promise, "I will return in after times, on an island bearing trees and swine and dogs."



Photograph from Mildred Leo Clemens

MONUMENT TO CAPTAIN COOK AT THE PLACE OF HIS DEATH, ON THE ISLAND OF HAWAII

The great geographer thought the exploration of the Hawaiian group one of his major achievements. His friends in England smiled indulgently at his enthusiasm about an archipelago so isolated. To-day Napoopoo, where Cook was worshiped as a deity, is the shipping port for most of Hawaii's coffee. Here the visitor looks down on Kealakekua Bay, scene of Cook's landing, and the white shaft to his memory stands out like a cameo against a background of luxuriant foliage.

When the masts and sails of the English vessels were sighted, and later when the animals were seen on board, the islanders proceeded to do obeisance to Rono, in the person of Captain Cook.

When Cook sailed away they considered the prophecy fulfilled; there had been no mention of his third coming, and their provisions were exhausted by the lavish gifts. Even a god can wear out his welcome.

Moreover, incidents had occurred upon the first visit which seemed to discredit the godlike qualities of the visitors. One of the crew died and Cook, unaware that he and his retinue were immortal in native eyes, buried him ashore. Then there was the matter of the fence about the sacred morai. The sailors were given permission to remove the fence because of their urgent need of wood, but they unwittingly removed images as well. Skepticism had set in after their first departure.*

HAWAIIANS LONG WORSHIPED THEIR VICTIM'S BONES

On the night of February 13, 1779, a cutter was stolen. Cook went ashore to seize the king and hold him as a hostage until the boat should be returned. The king was willing enough to come, but his people objected, and they became so menacing that Cook and the marines with him retreated.

Early the next morning as they neared the water Cook turned to signal the boat to pull in for his party. One native struck him over the head and, as he fell forward, another stabbed him in the back.

A few bones of Cook's body were returned after the natives had stripped it of the flesh, and on February 21, according to a brief entry in the ship's journal, "At sunset the *Resolution* fired ten minute guns, with the colours half staff up, when the remains of our late Commander were committed to the deep." Missionaries, on later visits to Hawaii, learned that the breastbone and ribs long were preserved by the islanders as objects of veneration.

The two ships returned to the Bering Sea, where Captain Clerke died, and Captain Gore, on the *Resolution*, succeeded to the leadership of the expedition, while Captain King took command of the *Discovery*.

When the vessels reached Macao and common seamen sold furs they had procured from Alaskan Eskimos for the equivalent of more than $100 each, it was borne home upon the survivors that, although their search for a northeast passage had failed, they had found a source of riches that rivaled the wealth of the Indies.

That esteem for Cook had already spread over the civilized world was attested by the orders of the Court of Versailles, at Franklin's instigation, to treat his expedition as the ships of a neutral. When the battered vessels returned without their great commander, honors were paid to his name in England, and sorrow was expressed by men of learning all over Europe.

The fate of Cook's family was as tragic as that of its head. Three of his six children died in their infancy; a fourth died in his teens; the other two met their death at sea.

In 1835, a white-haired old lady was laid to rest in a vault at the church of St. Andrew the Great, at Cambridge. A few aged friends mourned the passing, in her ninety-fourth year, of the widow of Captain James Cook.

FEW EXPLORERS HAVE EQUALED COOK'S GIFTS TO GEOGRAPHY

Few explorers have so widened the range of geographic knowledge as did Captain Cook. He girdled the Southern Hemisphere from Tasmania and New Zealand around Cape Horn and the Cape of Good Hope.

He spanned the great unknown Pacific triangle that, in the nomenclature of to-day, has its apex at Nome, while one leg rests at Melbourne and the other at Easter Island. He plunged again and again into this vast triangle, discovering or exploring the New Hebrides, the Society group, the idyllic Marquesas, the Tongas, New Caledonia, and scores of others.

In the wake of his explorations along the sides of this triangle to-day is the Territory of Hawaii, on one side, and Seattle, Vancouver, and Victoria on the other.

Time has added luster to Cook's name.

England has been called Shakespeare's Island; in another sense it is Cook's, for few men have so typified the peculiar genius of their race as has this navigator, who, by rigorous, though peaceful, pursuit of exploration and scientific study, won for his country a great colonial domain.

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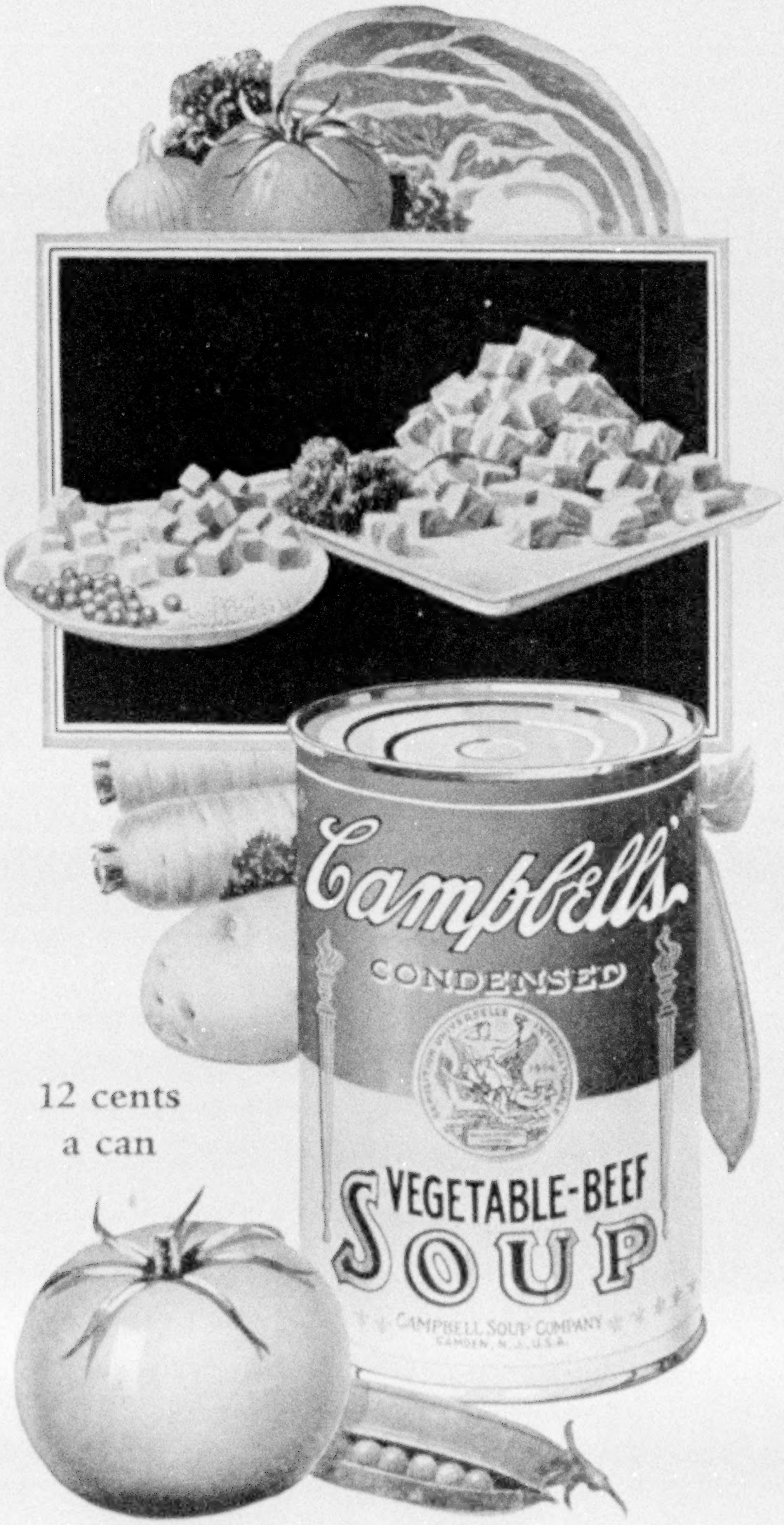
* See, also, "The Hawaiian Islands," by Gilbert Grosvenor, LL.D., in the NATIONAL GEOGRAPHIC MAGAZINE for February, 1924.

Tempting vegetables! Hearty beef! No wonder this soup is a favorite!



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a can

LOOK FOR THE RED-AND-WHITE LABEL

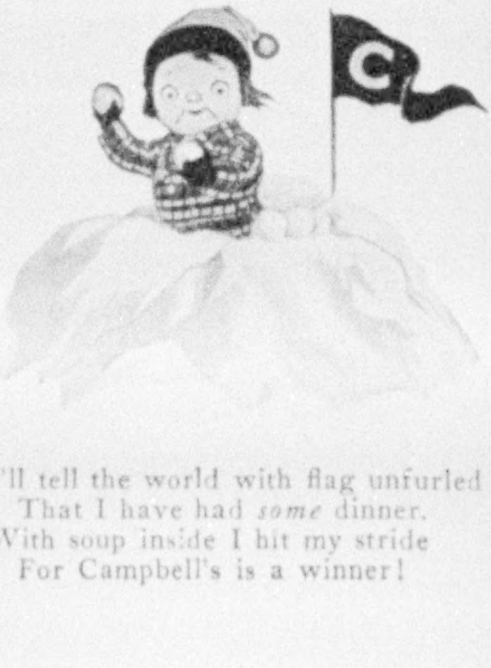
SOUP

and the man behind the desk

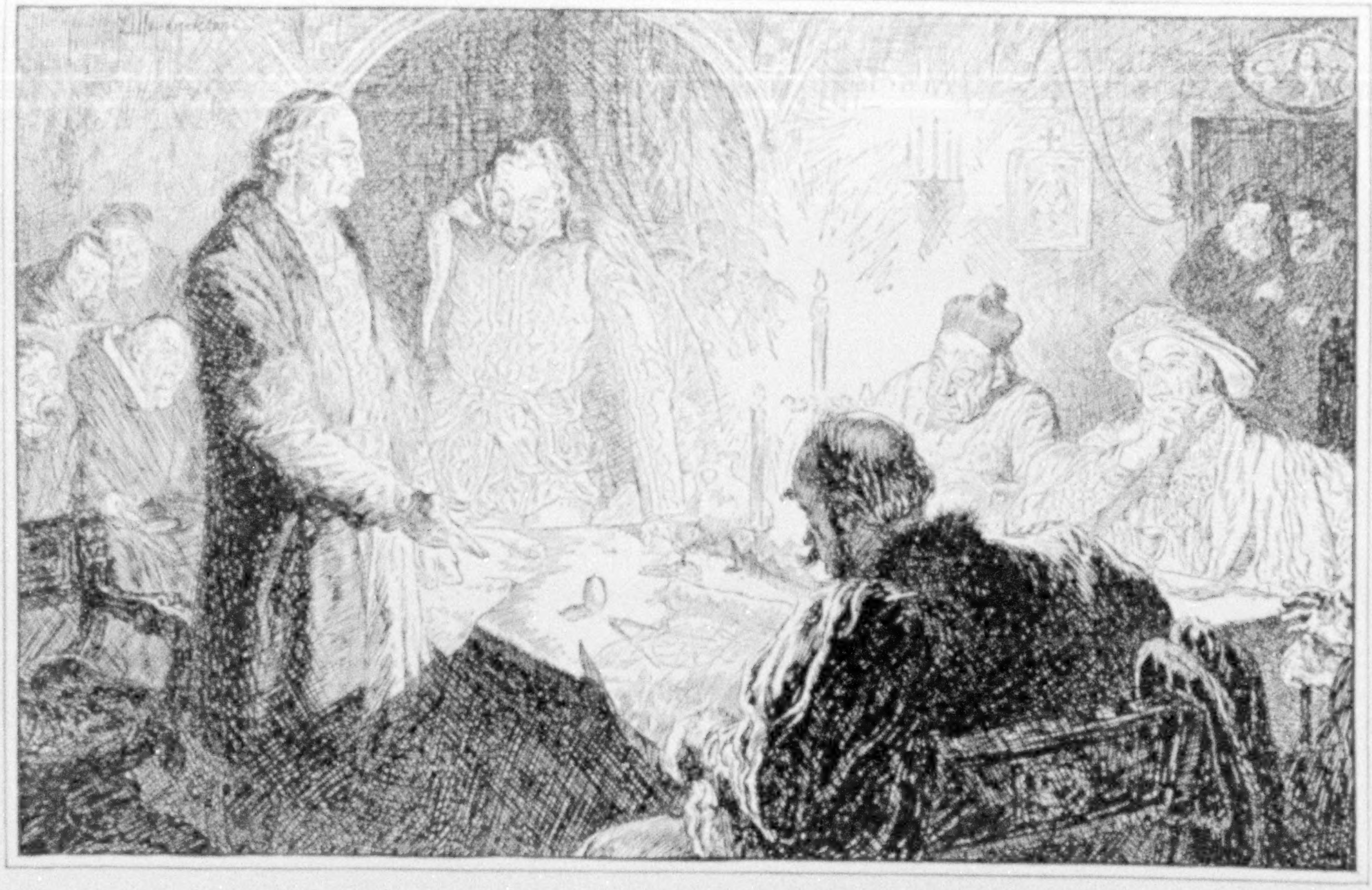
IS YOUR appetite always on the job? Do you eat the right food? Tomorrow at noontime, instead of eating a heavy meal that makes you drowsy and listless throughout the afternoon, eat a plateful of hot, substantial, invigorating soup as the main part of your lunch. Soup stimulates and spurs the appetite. Its delicious flavor tempts you, even on those days when you don't feel like eating other food. In the middle of the office worker's day, soup revives the energies and supplies nourishment in just the right quantity and form. It sends you back to your work refreshed and feeling fit.

ASK your wife to serve soup every day. It will have a splendid effect on your appetite and digestion. You will eat more and feel better. You know how much that helps.

And to the woman behind the man behind the desk, we have this special message: Remember that your husband leads a sedentary life. He must be tempted and coaxed with the right selection of healthful foods. Good nourishing soup, so easy for you to get at the store! Serve it to him regularly.



I'll tell the world with flag unfurled
That I have had *some* dinner.
With soup inside I hit my stride
For Campbell's is a winner!



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BELL SYSTEM
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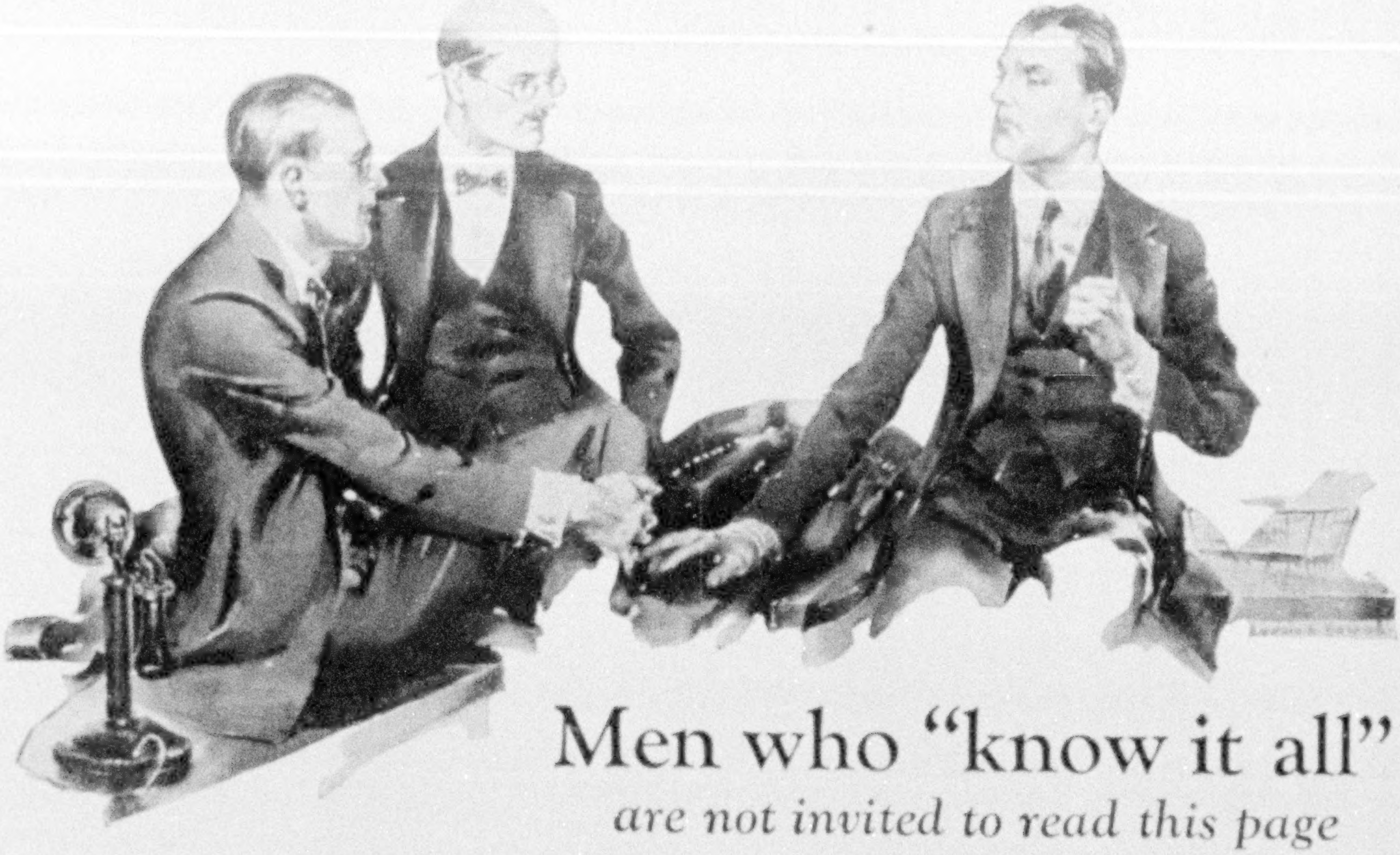
CHRISTOPHER COLUMBUS discovered America, thus adding a new world to the old. Alexander Graham Bell discovered the telephone, giving the nations of the earth a new means of communication. Each ventured into the unknown and blazed the way for those who came after him.

The creating of a nation-wide telephone service, like the developing of a new world, opened new fields for the pathfinder and the pioneer. The telephone, as the modern American knows it, has been made possible by the doing of a multitude of things in the realms of research, engineering and business administration. Its continued advancement requires constant effort in working upon a never-ending succession of seemingly unsolvable problems.

Because it leads the way in finding new pathways for telephone development, the Bell System is able to provide America with a nation-wide service that sets the standard for the world.



Men who "know it all"

are not invited to read this page

THIS page is not for the wise young man who is perfectly satisfied with himself and his business equipment, who believes that the only reason he is not paid twice as much is that he has never been "given a chance."

This page is a personal message to the man who has responsibilities, who feels secretly that he ought to be earning several thousand dollars more a year, but who simply lacks the confidence necessary to lay hold on one of the bigger places in business. We should like to put into the hands of every such man a copy of a little book that contains the seeds of self-confidence. It is called "Forging Ahead in Business," and it is sent without obligation.

We have in mind, for example, a certain man who is now auditor of a great corporation in the Middle West. Until he was thirty-one years of age he was a bookkeeper. His employers had made up their minds that he would always be a bookkeeper. His wife was beginning secretly to wonder. Worst of all, he himself was beginning to lose faith.

He Sent for "Forging Ahead in Business"

Without any great hope in its results, he enrolled in the Modern Business Course and Service. The first few months of his association with the Alexander Hamilton Institute were a revelation to him. He found himself being initiated into departments of business that had hitherto been a mystery to him. He was learning the fundamentals of purchasing, of merchandising, of advertising, of office and factory management, and corporation finance.

He began quietly to make suggestions to the officials—suggestions that surprised them, because they had ceased to expect anything from him. They revised their estimate of his capacities; when the position of auditor became vacant, he was given his chance. And recently on an important financial problem, he argued against the position of the company's own attorneys—basing his arguments on principles which the Institute had taught—and by proving his point succeeded in saving the company $60,000.

The self-confidence that the Institute gave him has transformed that man. He will be a vice-president of that great corporation, and at 31 he was condemned to be a bookkeeper for life.

Thousands Could Double Their Incomes

For the man who is perfectly content with himself and his job the Alexander Hamilton Institute can do nothing. But there are thousands of men who could double their incomes in one year if they believed in themselves and had the solid business knowledge to back up their belief.

To such men the Institute offers "Forging Ahead in Business"—a book with power in every page, and which also describes clearly and interestingly what the Alexander Hamilton Institute can do for you. Thousands of successful men regard it as one of the most valuable little books they ever sent for. May we send it to you? The coupon is for your convenience.

FILL OUT AND MAIL TODAY

ALEXANDER HAMILTON INSTITUTE
735 Astor Place, New York City

Send me the new revised edition
of "Forging Ahead in Business,"
which I may keep without charge.

Name ....
Print here

Business Address ....

....

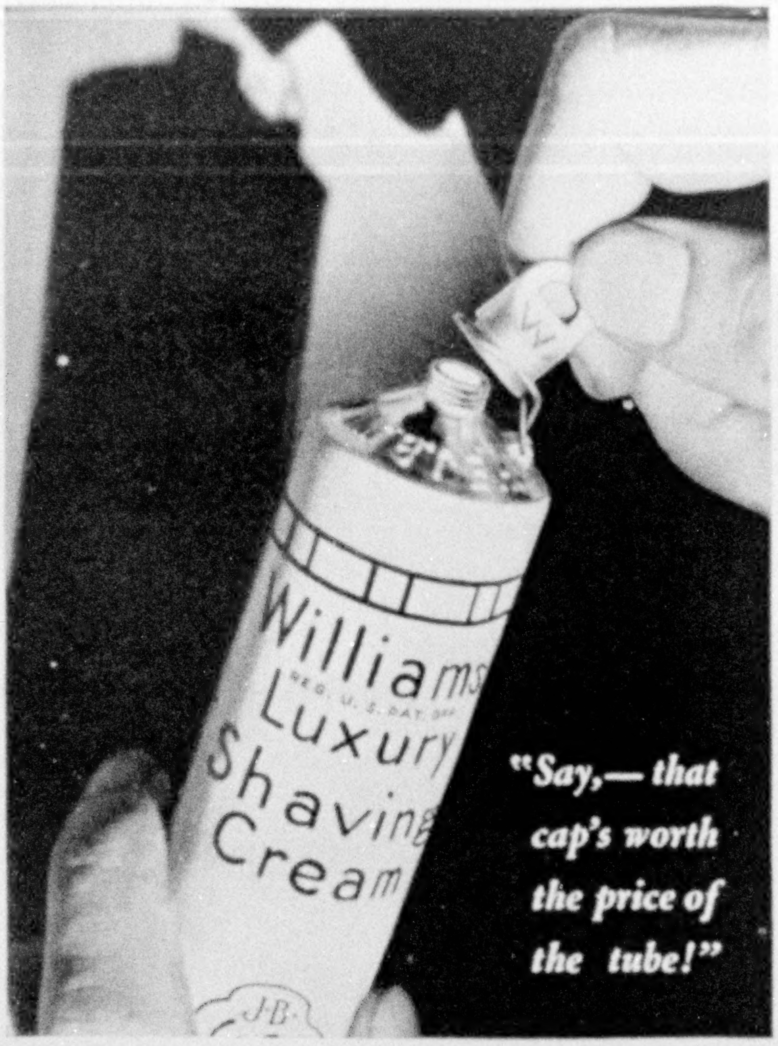
Business Position ....

Alexander Hamilton Institute

Executive Training for Business Men

IN CANADA, *address the Alexander Hamilton Institute, Limited,* C. P. R. *Bldg., Toronto*

IN AUSTRALIA, *the Alexander Hamilton Institute, 11c Castlereagh Street, Sydney*



"Say,— that cap's worth the price of the tube!"

This SATURATED LATHER

Makes All Razors Seem Sharper

WHEN you lather up with Williams Shaving Cream, you do two things. First, you remove the water-resisting oil film from your beard; then, you soak the beard soft with the moisture in Williams saturated lather.

Williams super-moist lather soaks the beard so soft that you get a new idea of razor sharpness. Blades just glide through Williams-covered stubble. Williams leaves the skin as smooth as a glove. The Double Size tube sells for 50c. It holds twice as much as the regular large-size tube at 35c.

Free Offer. We'll send you enough Williams Shaving Cream for a week's shaves. Send the coupon below—or a postcard.

Williams
Shaving Cream

AQUA VELVA is our newest triumph—a scientific after-shaving preparation. We'll send a generous test bottle free. Write Dept 51.

FREE TRIAL TUBE — SEND COUPON TODAY

The J. B. Williams Co., Dept. 51
Glastonbury, Conn.
Canadian Address: 1114 St. Patrick St., Montreal

Send me test tube of Williams Shaving Cream.

Name ....

Address ....

City ....

N G—1-27

A new beauty still further above the commonplace

In its alluring smartness and beauty the *new, finer* Chrysler "70" forecasts the new vogue in motoring design even more definitely than the first Chrysler did three years ago.

The first Chrysler "70" gave to all motoring a totally new combination of features and accomplishments.

Ever since, the entire industry has been adopting these features with varying success and celebrating them as new achievements.

And now the *new, finer* "70" presents even more epochal developments.

Newer, more exquisitely graceful bodies — newer, more distinctive silhouette with military front and cadet visor (see illustration) —newer luxury of comfort —newer, greater riding ease —newer richness of upholstery—newer, finer hardware —newer refinements in controls and lighting—newer, more attractive color blendings far in advance of current harmonies.

And with this newer appearance is the famous chassis—unchanged save for valuable refinements — whose basic performance, dependability and long life have been proved for three years by hundreds of thousands of enthusiastic owners.

CHRYSLER SALES CORPORATION, DETROIT, MICHIGAN
CHRYSLER CORPORATION OF CANADA, LIMITED, WINDSOR, ONT.

CHARACTER

Prices That Set a New Measure of Value for Finer Motoring

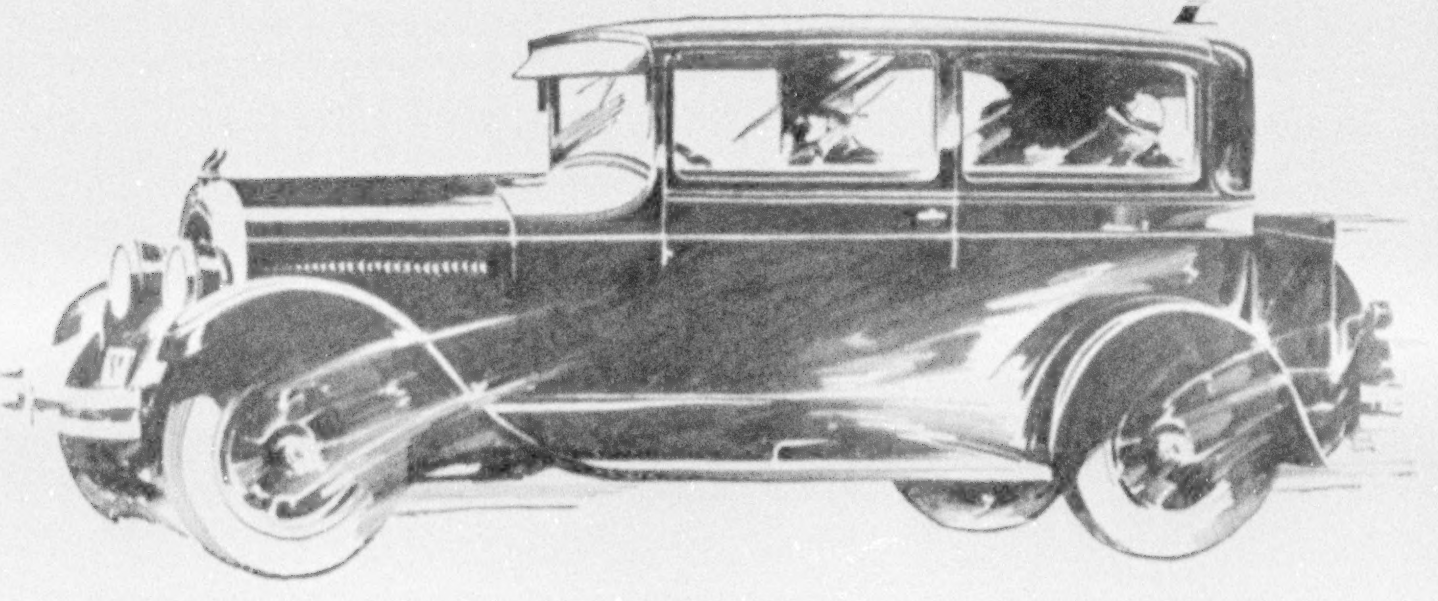
	New Prices
Roadster - - - -	$1495
Brougham - - - -	1525
Coupe - - - -	1545
Royal Sedan - - -	1595
Crown Sedan - - -	1795
Phaeton - - - -	1395
Sport Phaeton - - -	1495

All prices f. o. b. Detroit, subject to current Federal excise tax

Chrysler Model Numbers Mean Miles Per Hour

THE NEW, FINER

CHRYSLER 70



Follow the Birds to the SOUTHLAND

—to the Gulf Coast, a land of romantic charm and historic interest, where sunny skies and balmy breezes welcome you—where good hotels will house you in every comfort and at moderate cost—where all outdoor sports and recreations are at their best.

Hunting, fishing, boating, golf, tennis, motoring and horseback riding—all under perfect conditions—and splendid train service to the near-by cities of Pensacola, Mobile and New Orleans.

The Gulf Coast is a land of delightful winters, where all-season visitors may enjoy the advantage of good schools, churches, theaters, etc. Plan your visit for pleasure and maybe you will decide to stay for profit; for the Gulf Coast is developing safely, sanely and rapidly as a place of all-year residence, and it affords business and investment opportunities unexcelled in all the world.

Excellent train service *from the Central West and North by*

The Pan-American
ALL-PULLMAN

A train of unexcelled equipment, through from Cincinnati and Louisville to Pensacola, Mobile, New Orleans and the Gulf Coast. Every travel luxury—maid and valet service all the way—showers, club and observation cars—radio and the famous L. & N. dining-car service. Additional through-service from these cities, and from Chicago and St. Louis.

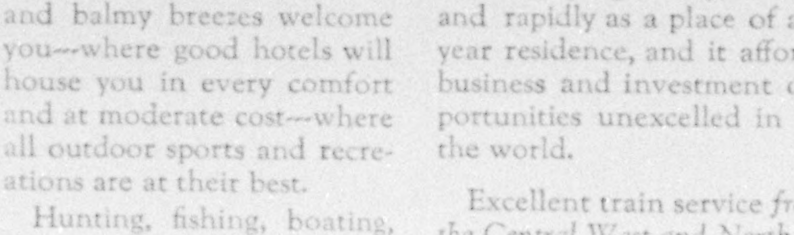
From the East, via the splendid all-new

CRESCENT LIMITED

the passenger is afforded similar equipment to that of The Pan-American—through from New York, Philadelphia, Baltimore and Washington to the Gulf Coast.

Several other fast trains daily provide through-sleeping-car accommodations.

See the
GULF COAST
Land of History and Romance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Chipley
Cottondale
De Funiak Springs
Crestview
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Pascagoula
Ocean Springs
Biloxi
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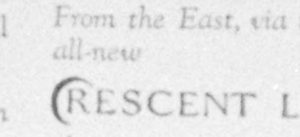
NEW ORLEANS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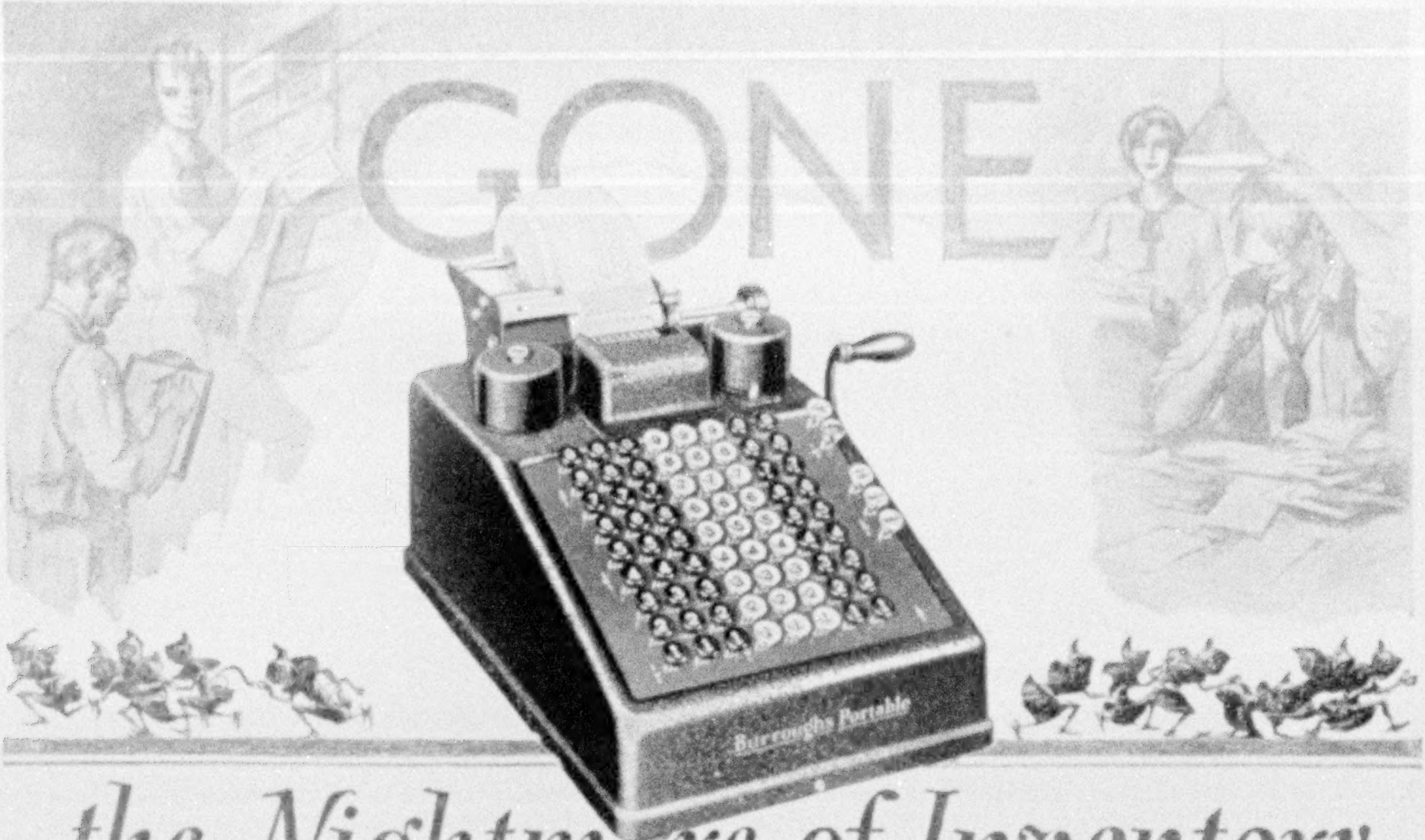
Let R. D. Pusey, Gen. Pass. Agt. L. & N. R. R., Room 303, 9th & Broadway, Louisville, Ky. tell you more about the Gulf Coast as a place to visit, to live and to prosper.

L&N

LOUISVILLE & NASHVILLE R·R·



the Nightmare of Inventory

Christmas joys are no longer marred by the nightmare of the year-end inventory that lies ahead.

Burroughs has taken the worry and burden out of inventory time. It has taken "CLOSED FOR INVENTORY" off the doors.

With Burroughs to help you, you can complete this year's annual inventory accurately and quickly. And for all the rest of 1927 you can keep a complete, more efficient record of sales, costs, stock and turnover.

The figures obtained by use of Burroughs Machines tell you which stocks are idle or slow, which are getting low—provide a dependable guide to purchasing and selling—check leaks, losses and errors at their source.

With a Burroughs Portable Adding Machine, the items are listed, extensions made and printed proofs of accuracy provided far faster than you can do the work with pad and pencil. The Portable is easily moved from place to place. A girl can handle it. It takes up little space. It has the standard full-visible keyboard.

The Burroughs Calculator too, is a rapid figuring machine that has greatly simplified inventory work in many large institutions.

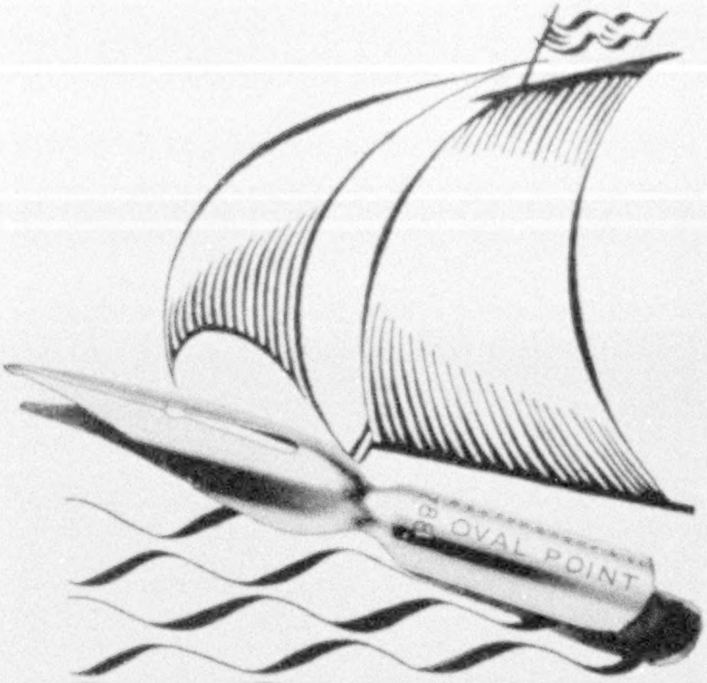
Why dream and fret about inventory, when Burroughs will banish the nightmare forever? Put yourself at the helm of your business with Burroughs. Leave worry behind with your pad-and-pencil competitors!

BURROUGHS ADDING MACHINE COMPANY
6241 Second Boulevard, Detroit, Michigan

Burroughs Adding Machine of Canada, Limited, Windsor, Ont.
Sales and Service Offices in all the Principal Cities of the World

Burroughs

ADDING - BOOKKEEPING - CALCULATING AND BILLING MACHINES



SAILING thru work!

Skimming your sea of correspondence! Fast, free, exhilarating—this smooth, easy pen!

Every letter, every card, clearly reflects your own personality, if you use the *personal* pen, your own fresh Esterbrook.

With a fresh Esterbrook your good-will has a clear direct channel of expression. It *lives*, there on the paper, because you're using a new pen, a quick, clean Esterbrook.

At the office, at home and at school, avoid strain and waste by using plenty of new Esterbrooks. Esterbrooks *stay* fresh longest. Have them handy all the time!

TRUE ECONOMY, ALWAYS A FRESH

Esterbrook

FREE ESTERBROOK STEEL PEN CO. Dept. N-2
CAMDEN, N. J.

☐ Send me, free "The Book of 100 Famous Signatures," showing the autographs of illustrious men and women—and a sample of Pen No. 788.

☐ Send me, free, the Esterbrook Chart of Handwriting to help me find the pen best suited to my hand—also a sample of Pen No. 788.

☐ I enclose 15 cents, for which send me the "12 Most Popular Pens in the World."

WRITE YOUR NAME AND ADDRESS IN THE MARGIN BELOW

All-Expense Tour to Europe 37 days for $385

Summer of 1927

YOU can go abroad for thirty-seven days or more, at modest expense, with the Art Crafts Guild Collegiate Tours. Our congenial parties are composed of college students, teachers, artists, club members and professional people—each party personally conducted. A dance orchestra from a famous American University accompanies each tour. Plenty of deck space on shipboard for dancing, games, rest and recreation. See England, Holland, Belgium, France—37 Days, All-Expense Trip, personally conducted, $385.

Via Canadian Pacific

"World's Greatest Travel System"

Weekly sailings from Montreal and Quebec during June, July and August. Two days down the picturesque St. Lawrence. Only four days open sea. A week in London. Eight days in Paris. Three days in Ostend. Fascinating trips to English castles, the Shakespeare country, Oxford, The Hague, Bruges, the battle areas and other places famed in history and literature. Ample time for individual sight-seeing and shopping.

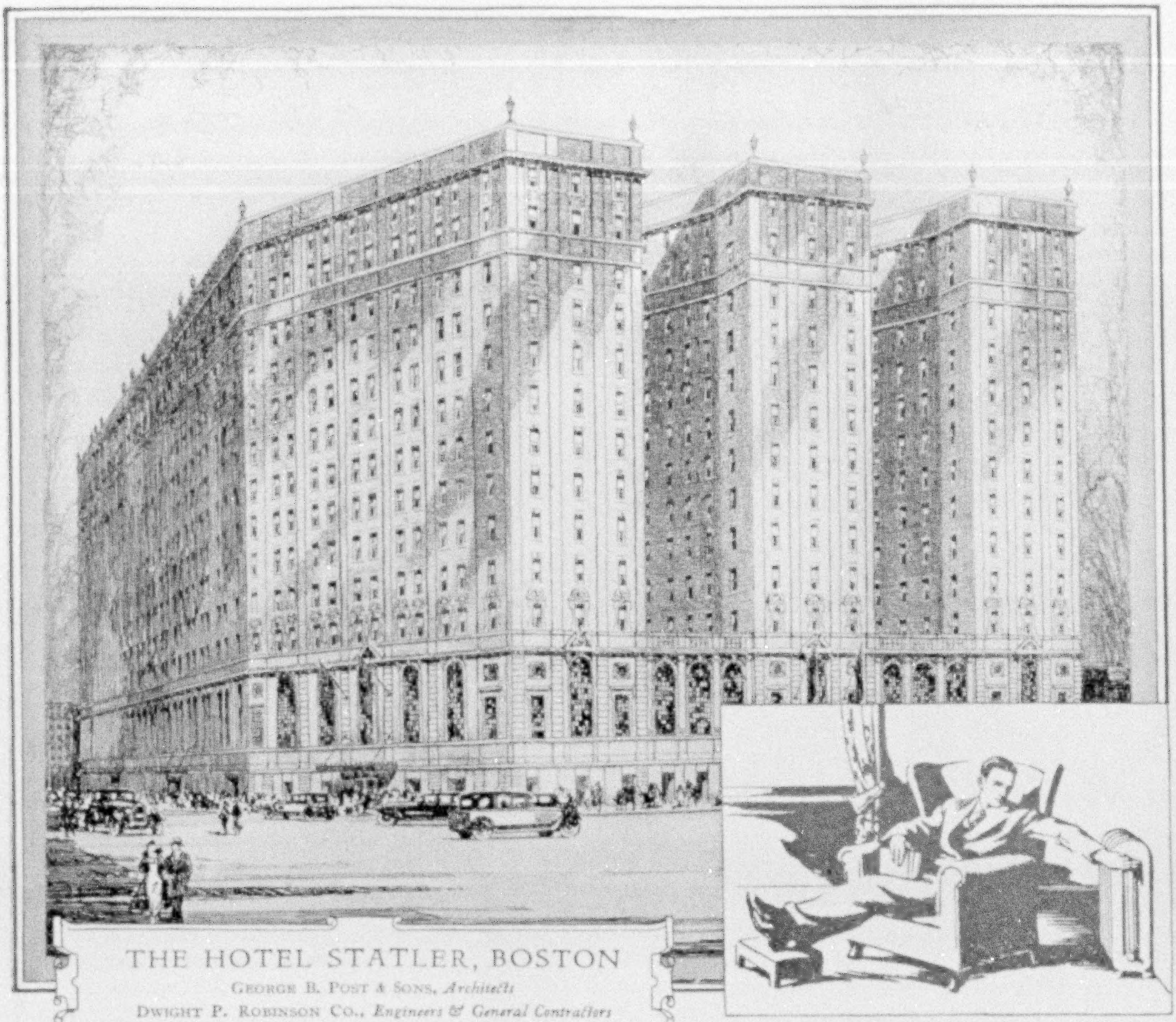
FREE TOUR BOOK

Tour price includes all necessary expenses on ship and shore. Extensions to Scotland, Ireland, Switzerland, Germany and Italy at moderate cost.

Write for illustrated literature giving complete detailed itinerary.

Art Crafts Guild Travel Bureau,
Dept. 327, 500 North Dearborn St., Chicago, Ill.

ART CRAFTS GUILD
Collegiate Tours



THE HOTEL STATLER, BOSTON
George B. Post & Sons, *Architects*
Dwight P. Robinson Co., *Engineers & General Contractors*

Installing Statler Comfort in 1300 Rooms

Another job for Walworth

Boston's new Hotel Statler is the largest hotel in New England. All the valves and fittings on the miles of pipe in its plumbing, heating and power lines have been supplied by Walworth.

There is an odd significance in this because the first building in the United States to be heated by steam was a Boston hotel, for which Walworth planned the installation and supplied the materials, in 1845. Before that, guests had to wear overcoats in their rooms and break the ice in the pitcher on winter mornings.

The Walworth valves and fittings installed in this new Statler not only help to run the elevators and electric lights, but carry ice water to every room, supply 1300 individual baths, and make it possible to regulate the heat of your room to exactly your own idea of comfort.

If it taxes your temper to have something go wrong with the lighting, heating or plumbing in your own home, imagine how sure of these systems a hotel has to be with 1300 guests to keep comfortable.

Perhaps you are building a house or discussing plant equipment for your business. Foremost in your mind are the safety and faultless operation of all the piping systems. You don't want to be bothered with details.

All right. Keep Walworth in mind as the makers of valves and fittings you can always depend on and you won't have to worry about "details" either now or later on.

WALWORTH

VALVES, FITTINGS AND TOOLS
for STEAM, WATER, GAS, OIL AND AIR

WALWORTH COMPANY, Boston, Massachusetts ~ ~ Distributors in Principal Cities of the World

Summer flowers in Midwinter!

IN SAN DIEGO winter cold and summer heat are both unknown. Here the thermometer varies only 13° between January and July.

No wonder thousands come here to enjoy *July* sunshine, *July* flowers, *July* sports — all year 'round!

Fine boulevards lead to splendid beaches where there is swimming, yachting, aquaplaning and fishing — to various lovely mountain retreats among the big trees — to some of California's grandest scenery — to Mission San Diego where California history began.

Nearby is famous Coronado; La Jolla, jeweled paradise; beautiful Point Loma; Mission Beach — each alone worth a trip West.

You will revel in San Diego's sunshine, her flowers, her recreation, her incomparable charm. Remember, too, that living costs are less here, and San Diego's investment opportunities are worth your careful consideration.

Mail the coupon below and let us send you a beautifully illustrated booklet free.

San Diego
California

SAN DIEGO-CALIFORNIA CLUB
604-B Chamber of Commerce Bldg., San Diego, Calif.
GENTLEMEN: Please send me, free, your fascinating story of San Diego, California

*Name*____________________________

*Address*____________________________

St. Louis has 28 Railroads *"To Everywhere"*

PLANTS in St. Louis have the advantage of a short haul, minimum freight costs and most direct service to their customers by rail or river. They *Ship From the Center—Not the Rim.*

They are closer to their markets and the sources of raw materials than their eastern competitors. They save time in assembling materials and in making deliveries.

Your factory in St. Louis would reach its markets quickly *in all directions.* St. Louis is not cut off on any side by lakes, oceans, mountains or other natural barriers to economical distribution.

Write for our new booklet, "Why St. Louis Grows." It tells the full story.

Address Dept. 15

ST. LOUIS
CHAMBER OF COMMERCE
ST. LOUIS, U.S.A.

Cultivate this good habit

Each day more men and women are learning that good health and beauty are dependent upon the condition of teeth and gums. They practice simple preventive measures. And they never forget to go to their dentist at least twice a year.

4 *Out of* 5 Pay *Pyorrhea's* Price

Unless a vigilant guard is kept against it, Pyorrhea steals into the mouth and starts its deadly work. Its poison creeps through the system. In its wake follow rheumatism, anemia, stomach troubles and embarrassing facial disfigurement.

It takes as its victims 4 persons out of 5 after 40 and thousands younger.

Don't fear these uneven odds. With a little care you can protect yourself against Pyorrhea. Go to your dentist for a thorough examination, once every six months. And start using Forhan's for the Gums regularly, morning and night.

It is the one dentifrice specifically designed to combat Pyorrhea. It is the formula of R. J. Forhan, D. D. S., who for years specialized in the treatment of this disease.

Start using Forhan's for the Gums, tonight. It contains Forhan's Pyorrhea Liquid, used by dentists everywhere. It helps to ward off Pyorrhea or helps to check its course if used regularly and in time.

It firms gum tissue and keeps it sound. It keeps teeth snowy white and protects them against acids which cause decay.

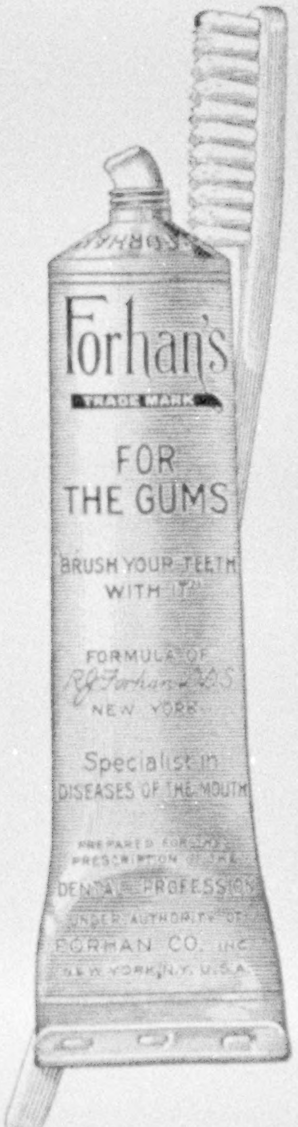
As health insurance and protection against Pyorrhea, use Forhan's. Teach your children this good habit. Get your first tube, today. At all druggists—35c and 60c.

Formula of R. J. Forhan, D. D. S.

Forhan Company, New York

Forhan's

FOR THE GUMS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BRUSH YOUR TEETH WITH IT
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R.J. Forhan D.D.S.
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Specialist in
DISEASES OF THE MOUTH
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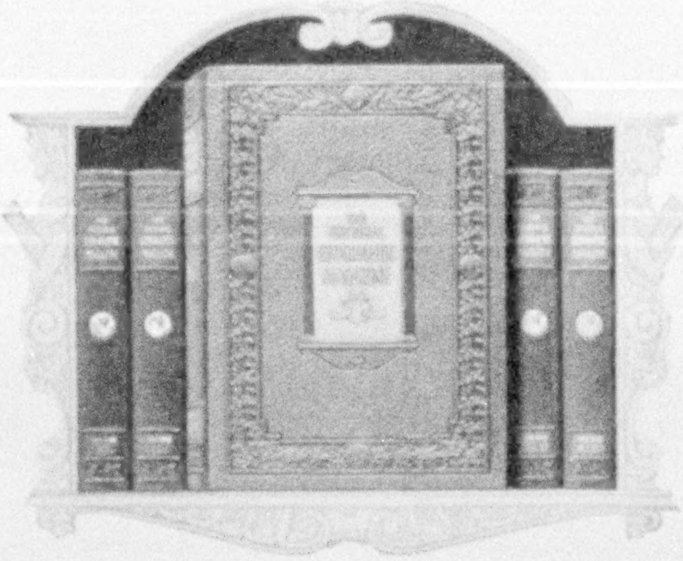


National Geographic Binders *for* 1927

Now Ready

Start the new year right by placing your National Geographics, as they are issued, in beautiful Molloy Made library binders. Over 25,000 members of the Society are now using these covers. Do not take a chance on issues being mislaid or destroyed. The only sure way of keeping your set complete is to place them in the binders as they are received.

Molloy Made Geographic binders are made of a durable leather-like cloth finished in two-toned hand-colored brown with gold titles and deeply embossed. A handsome addition to any library.

Binders are now available for 1927 and all years back to 1910.

You can easily do the binding *yourself* without any glue or thread, and, as each cover holds six numbers, it takes two covers for each year. Price, $2.00 each or $3.65 per pair. State volume number and year desired. Complete instructions with punch and necessary fasteners are supplied with each binder. We guarantee the binders to be absolutely satisfactory, and if not, your money will be cheerfully refunded.

Sent on Approval

For a limited period we will send binders on 10 days' approval anywhere within the United States. Order covers for past, present and future issues.

The David J. Molloy Company
2863 North Western Avenue, Chicago, Illinois

THE DAVID J. MOLLOY COMPANY
2863 North Western Ave., Chicago, Ill.

Enclosed find $ .... for which send me ....
pair of Molloy Geographic Covers, vols. ....
.... for years ....

If I am not entirely satisfied, I will return the covers within ten days and you will cheerfully refund my money.

Name ....

Address ....

THOSE who are partial to memorials whose distinctiveness lies in impressive simplicity many times choose the tablet as best fitting their desires.

Harrison designers will gladly prepare sketches of this or any other type of memorial embodying such suggestions as you may care to make. This service is without obligation to you.

Write for Booklet "C"

HARRISON GRANITE CO., INC.
Established 1845
4 E. 43rd ST., AT FIFTH AVE., NEW YORK
Offices—Detroit Chicago Pittsburgh Minneapolis
Works: Barre, Vermont

HARRISON MEMORIALS

1927 Calendars

Always look better and are more easily put up without marring the wall when you use

Moore Push-Pins

Glass Heads—Steel Points

Harmonize with Any Color Decoration

For Heavy Framed Pictures Use

Moore Push-less Hangers

Strong as Your Wall

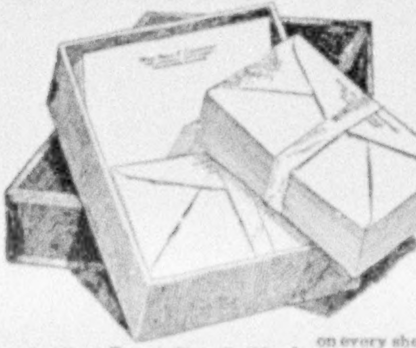
10c Pkts. Everywhere

Send for free samples with an illustrated folder showing many uses

Moore Push-Pin Co., Philadelphia, Pa.

Small Colored Map Tacks on a city map tell at a glance where items of interest are located. Send for sample and color folder

200 Sheets—100 Envelopes



$1.00
Post Paid

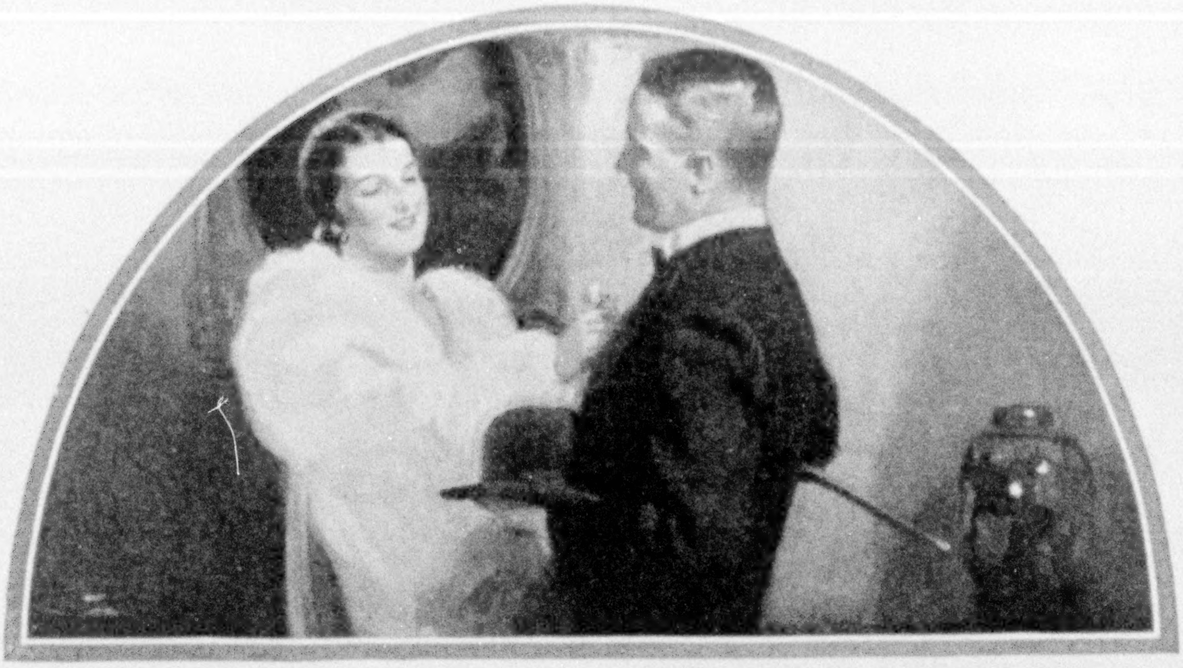
High grade, clear white bond paper—unusually smooth writing surface. Size 6x7 inches with envelopes to match. Has that crisp, crackly "feel" that identifies it to everyone as superior quality stationery.

Name and Address Printed Free

on every sheet and envelope in rich dark blue, up to 4 lines. Type is Plate Gothic, designed especially for clearness and good taste. Makes a personal stationery you will be delighted to use. An ideal gift with your friend's name. Attractive 3 letter monogram if preferred.

Just send $1.00 (west of Denver and outside U. S., $1.10) and this generous supply of stationery will come by return mail, postage prepaid. Securely packed in a sturdy blue box. Please write or print clearly. Prompt service and satisfaction guaranteed. Money refunded if you are not pleased in every way. Order today!

National Stationery Co., 1551 Lincoln Highway, Batavia, Illinois



The art of smiling charmingly is the art of caring properly for one's teeth. That is why Pepsodent, urged by dental authorities for its unique therapeutic and prophylactic properties, is also universally placed by experts, these days, near the top of the list of modern beauty aids.

When Teeth are Film Free

SMILES ARE CHARMING

The Stubborn Film on Teeth to Which Science Ascribes Many Tooth and Gum Disorders. What Numbers of Authorities Suggest Doing for It

RUN your tongue across your teeth, and you will feel a film—a viscous, slippery coating which ordinary brushing fails to remove successfully.

Film absorbs discolorations from food, smoking, etc. That is why, according to leading dental opinion, teeth look dingy and "off color."

Film clings to teeth, gets into crevices and stays. It invites and breeds the germs of decay. And that is why it is judged so grave a danger to the teeth by authorities.

Now an effective film combatant

Film is the basis of tartar. And tartar, with germs, is the chief cause of pyorrhea. That is why regular film removal is urged as probably first in correct gum protection.

Most dental authorities urgently advise thorough film removal at least twice each day. That is, every morning and every night.

For that purpose, obtain Pepsodent, the special film-removing dentifrice which leading dental authorities favor. Different from any other.

Removes film—Firms the Gums

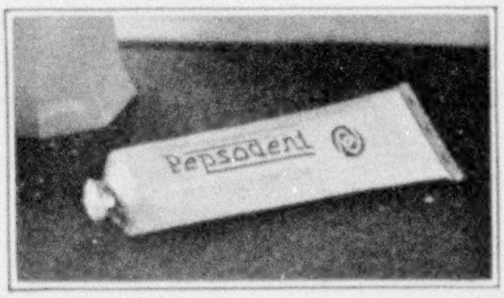
Pepsodent curdles the film, then removes it; then polishes the teeth in gentle safety to enamel. It combats the acids of decay and scientifically firms the gums. It multiplies the alkalinity of the saliva. And meets, thus, in all ways, the exactments of modern dental science.

No other method known to science embodies protective agents like those in Pepsodent.

Please accept Pepsodent test

Send the coupon for a 10-day tube. Brush teeth this way for 10 days. Note how thoroughly film is removed. The teeth gradually lighten as film coats go. Then for 10 nights massage the gums with Pepsodent, using your finger tips; the gums then should start to firm and harden.

At the end of that time, we believe you will agree, that next to regular dental care, Pepsodent, the quality dentifrice, provides the utmost science has discovered for better tooth and gum protection.

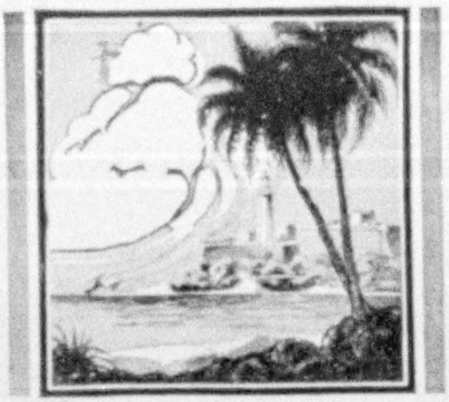


FREE—Mail coupon for 10-day tube to The Pepsodent Company, Dept. 982, 1104 South Wabash Ave., Chicago, Ill., U. S. A. Only one tube to a family.

Name..

Address ....

.... 2280



West Indies

$12 a day for a sixteen day Cruise to 5 foreign lands

IT'S almost unbelievable that so perfect a cruise can be so brief. But you really do see Havana, Jamaica, Porto Rico, Haiti, and Bermuda or Nassau. You live in pleasant luxury aboard the *Megantic*. And you find rest and renewed strength in the sunny, tangy days at sea. For those who have more time to spare there are 17, 18 and 26-day cruises—the latter to *ten* foreign lands.

* * *

Specially constructed for cruising in warm climates, the *Megantic* is well ventilated and completely comfortable. She has salt-water swimming pools on deck and every facility for shipboard enjoyment.

Five cruises—ranging from sixteen to twenty-six days—to take you away for only so long a time as you can spare.

Sailing from New York

Jan. 15th—16 days.
Mar. 5th—17 days.
Apr. 14th—16 days.
Feb. 3rd—26 days.
Mar. 24th—18 days.
Rates $200 up.

4 Mediterranean Cruises—46 days
White Star liner *Adriatic*
Red Star liner *Lapland*

Please send for details

Address No. 1 Broadway, New York City, our offices elsewhere, or any authorized agents.

WHITE STAR LINE
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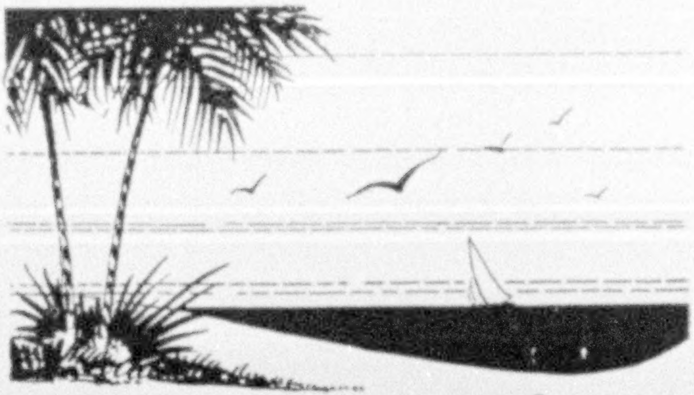

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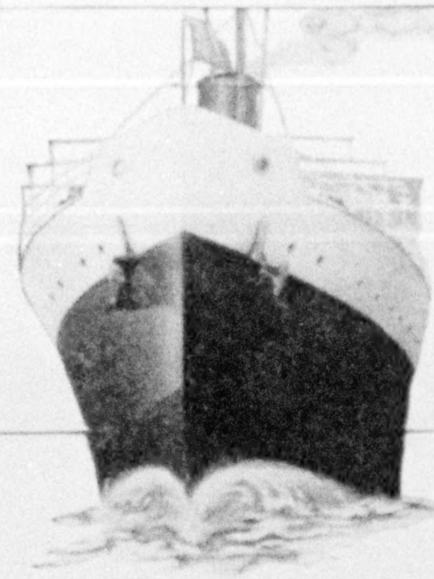

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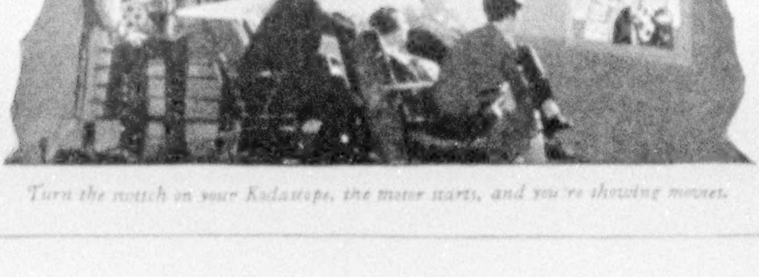

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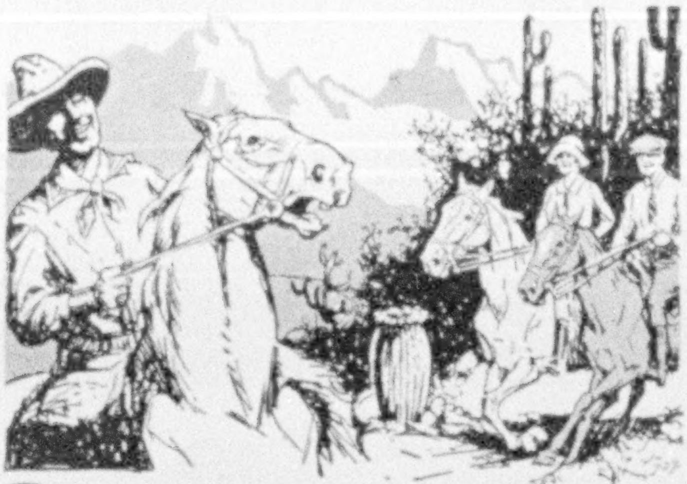

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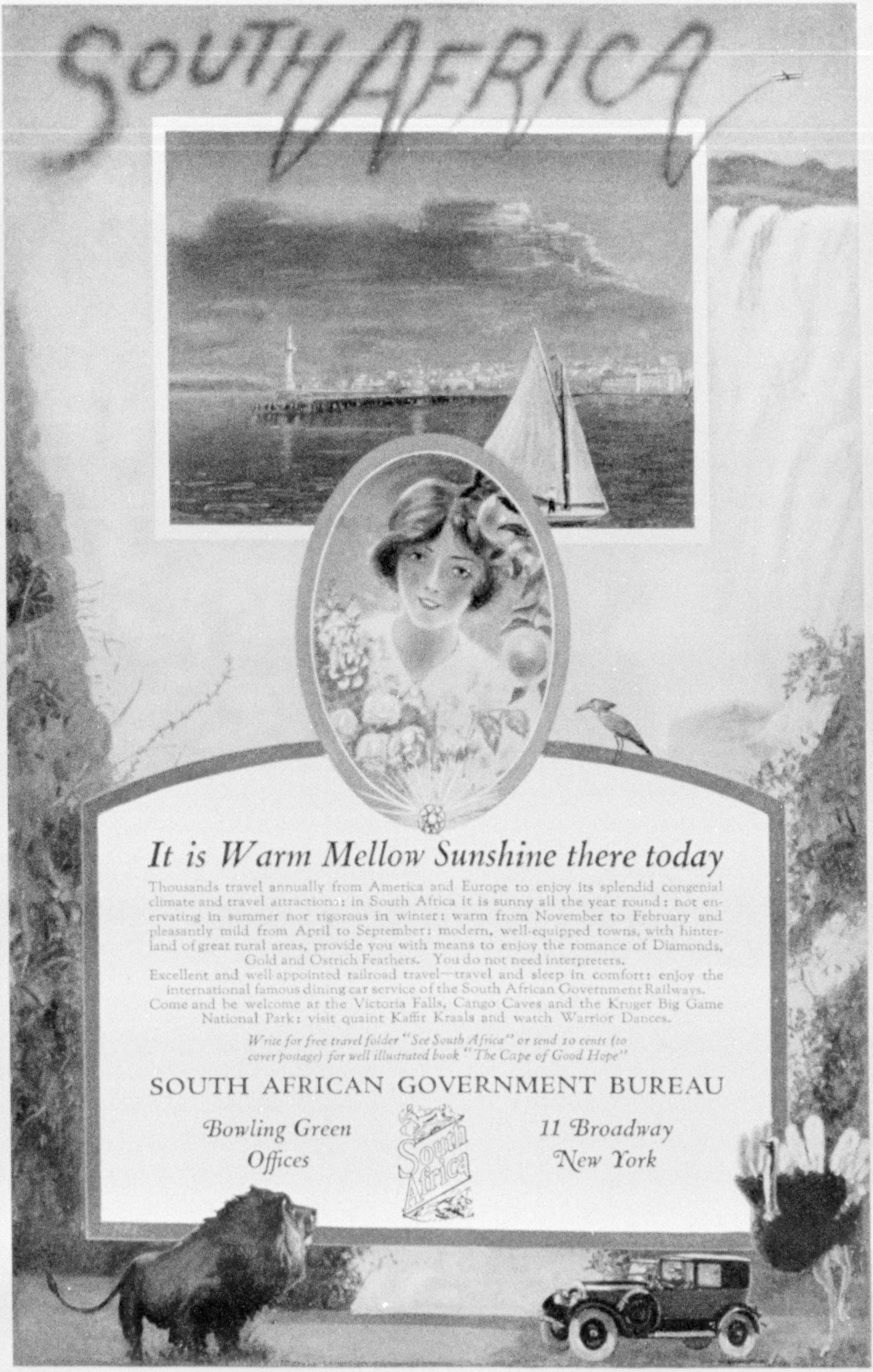

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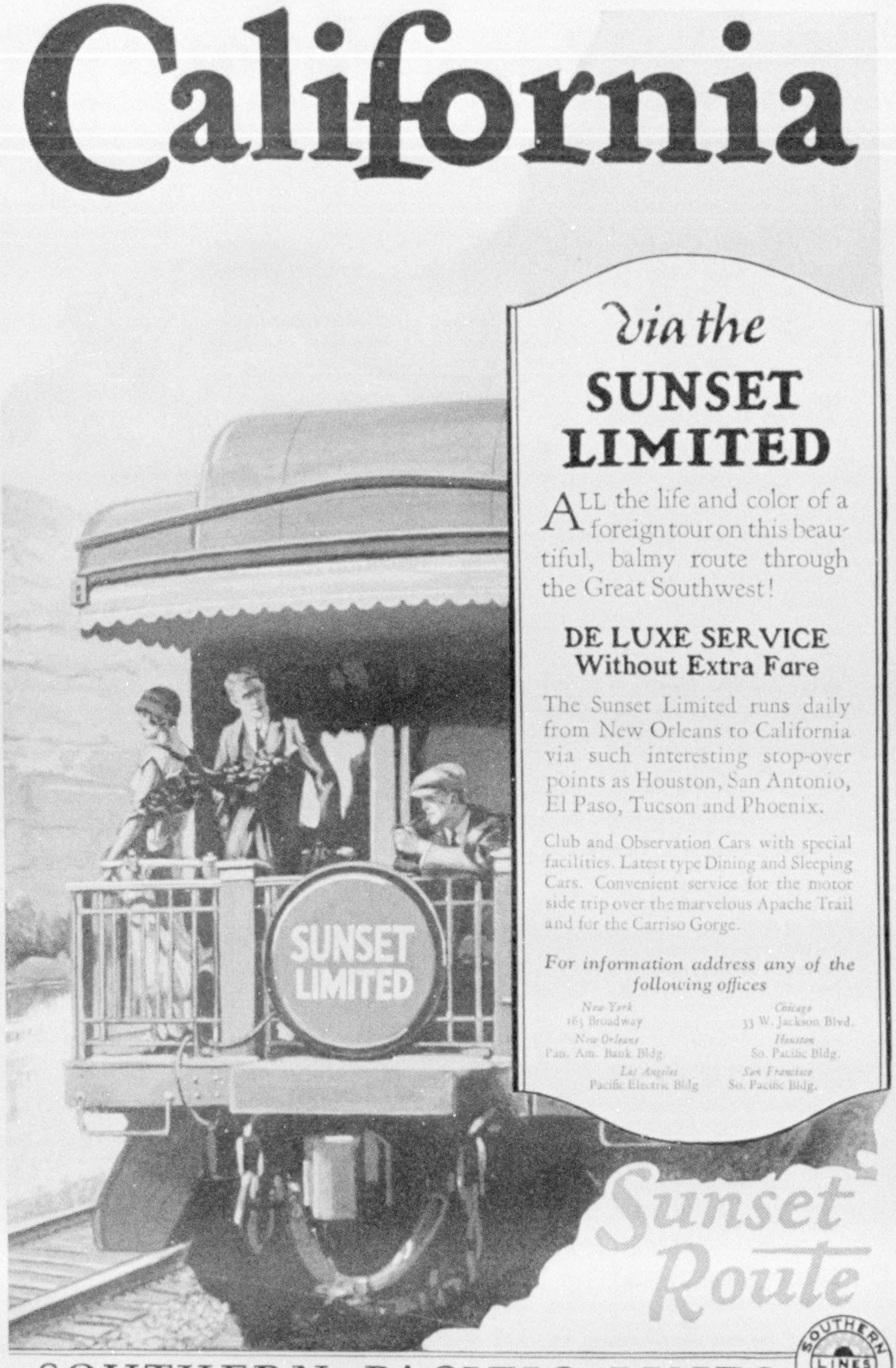

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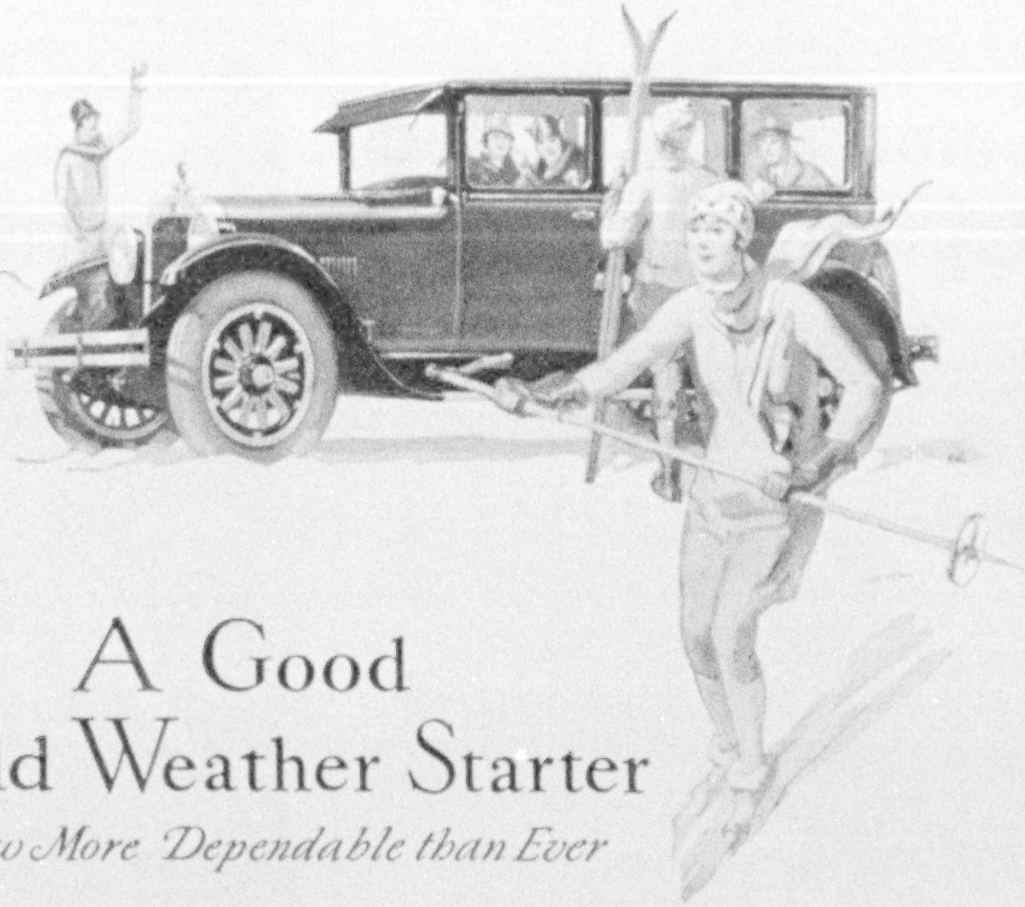

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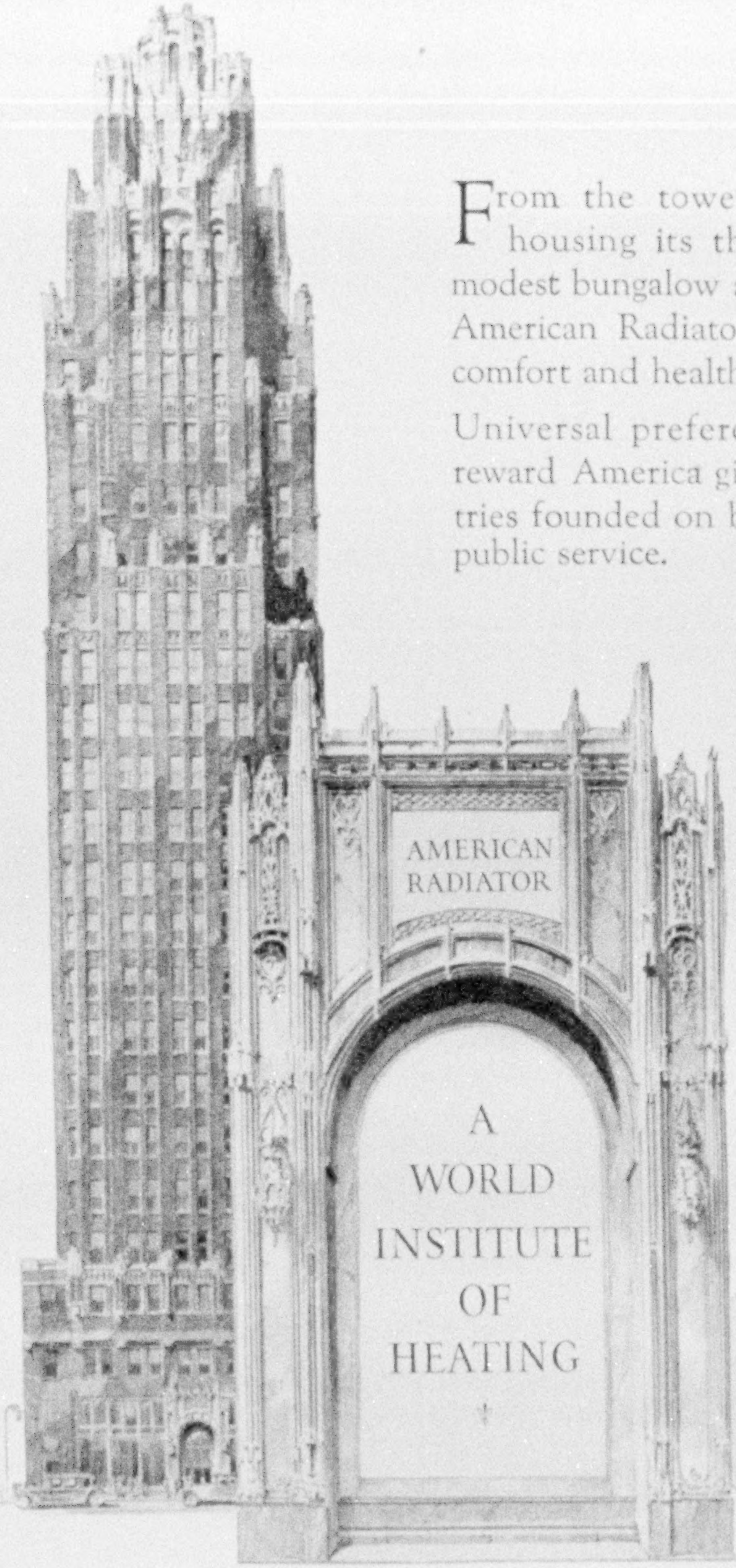

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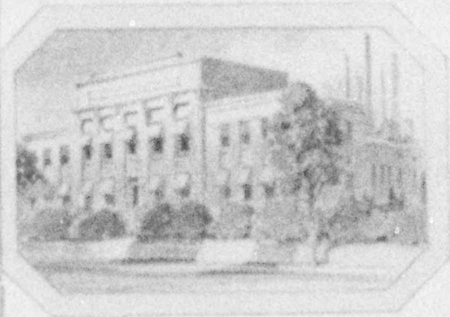

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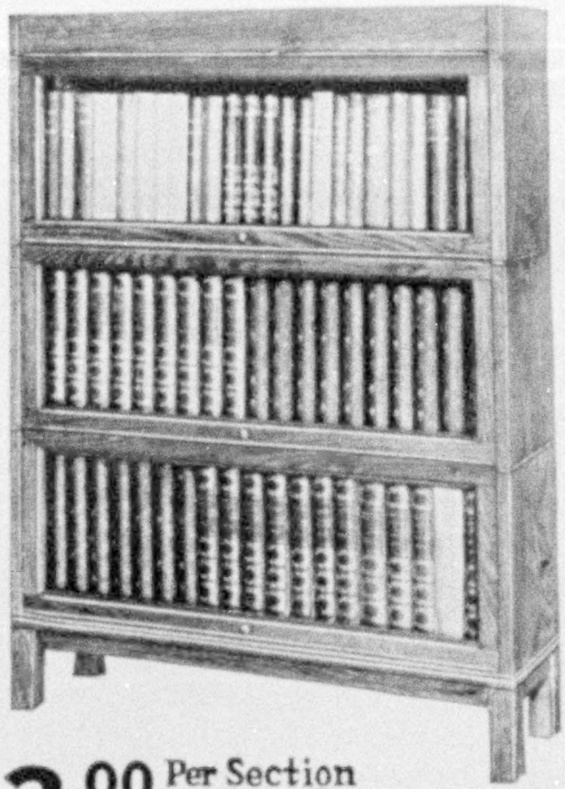

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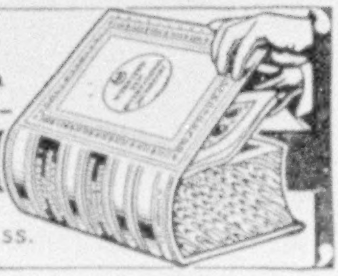
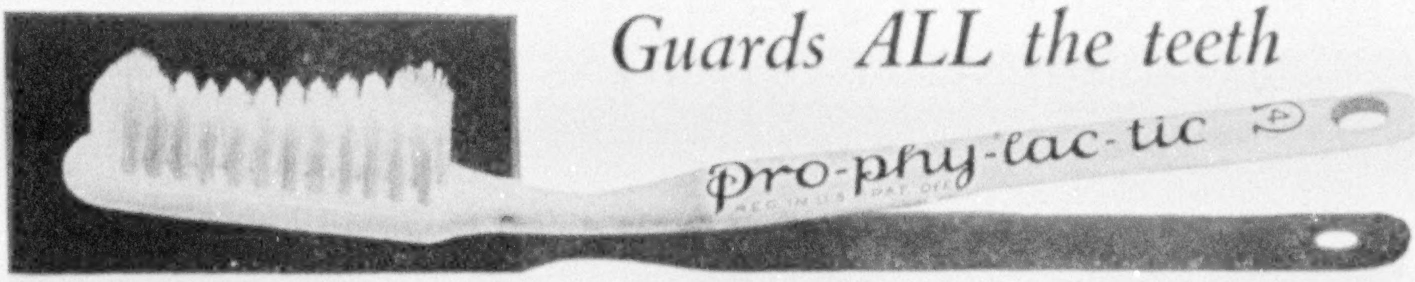


Guards ALL the teeth



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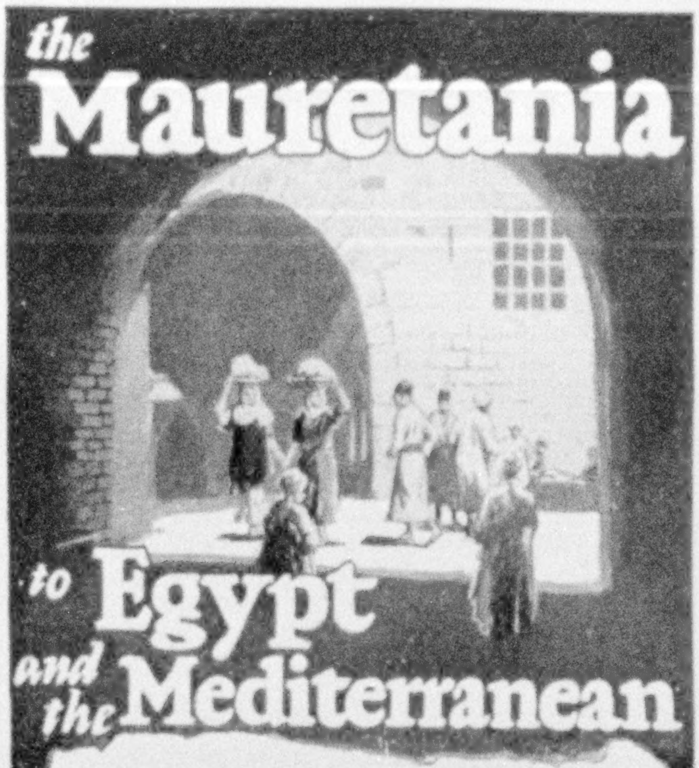

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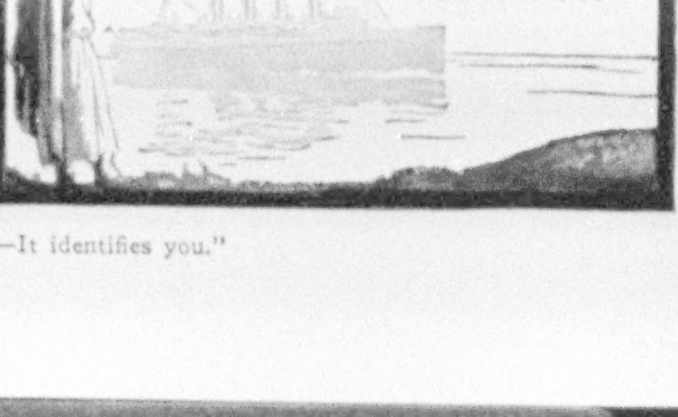

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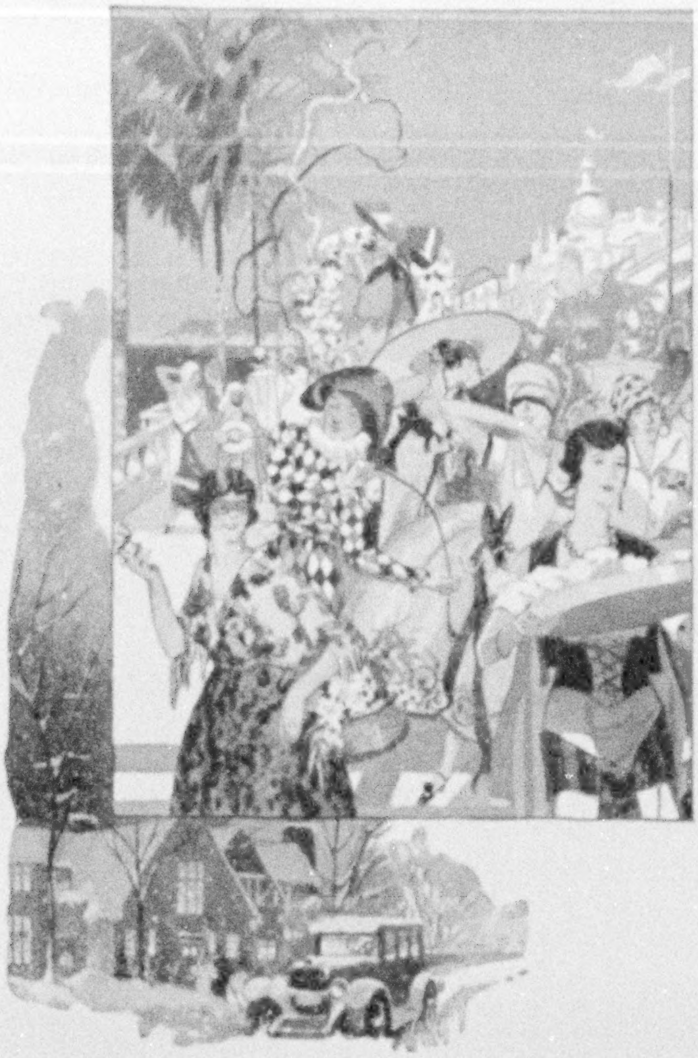

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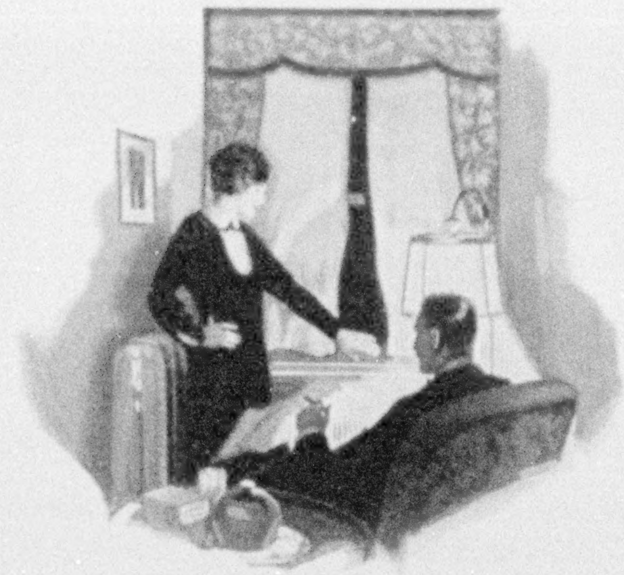

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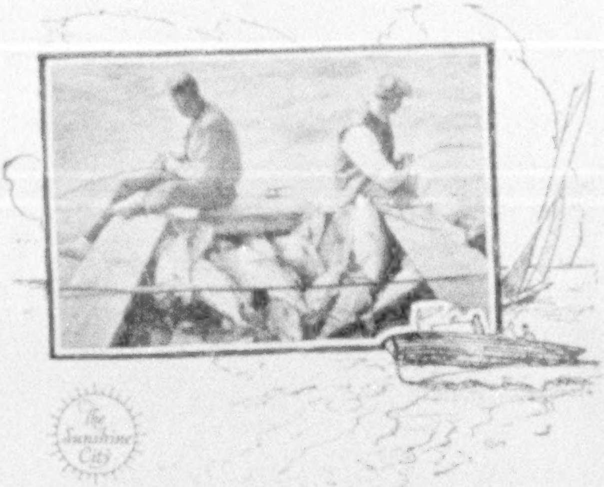

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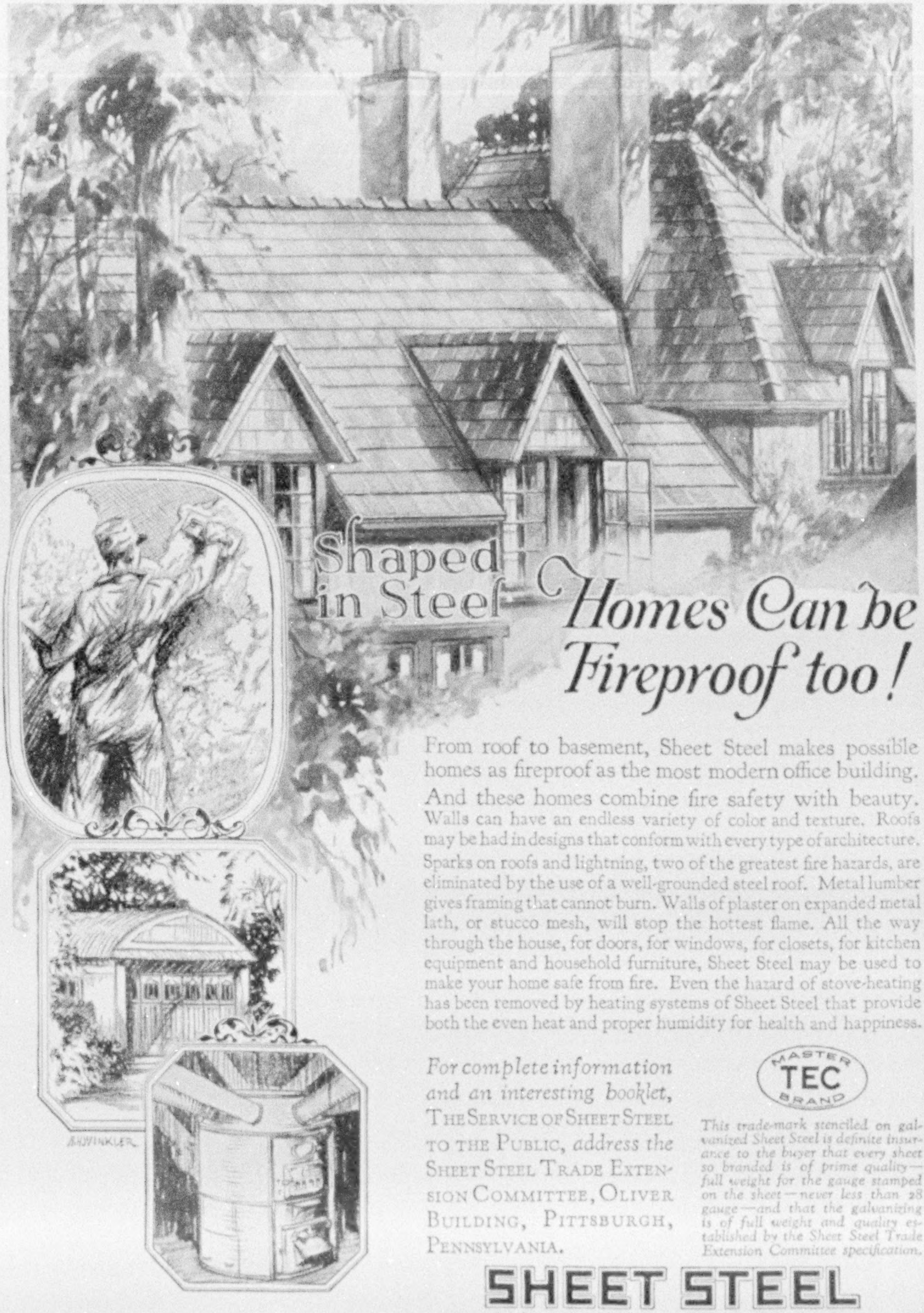

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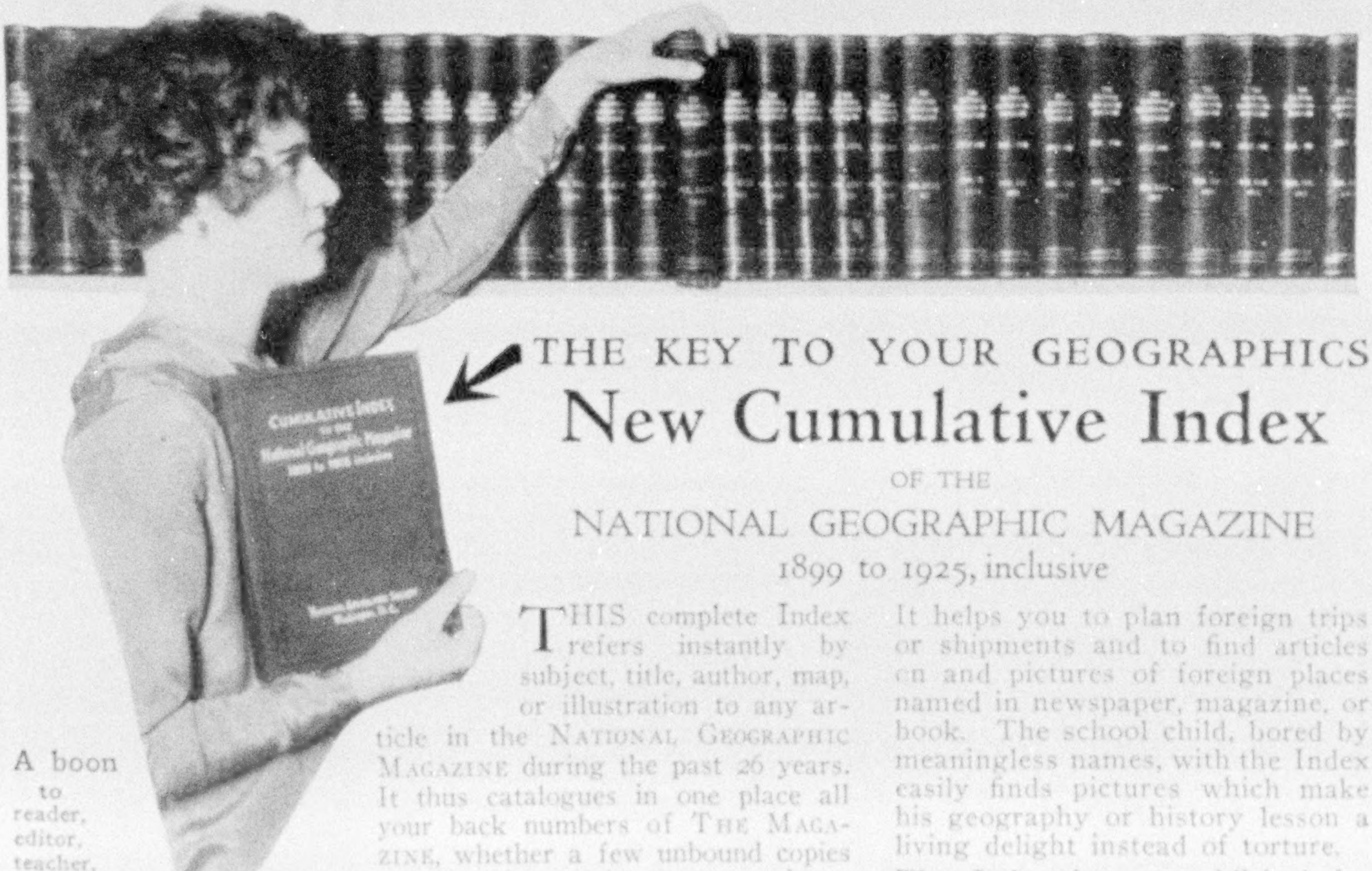

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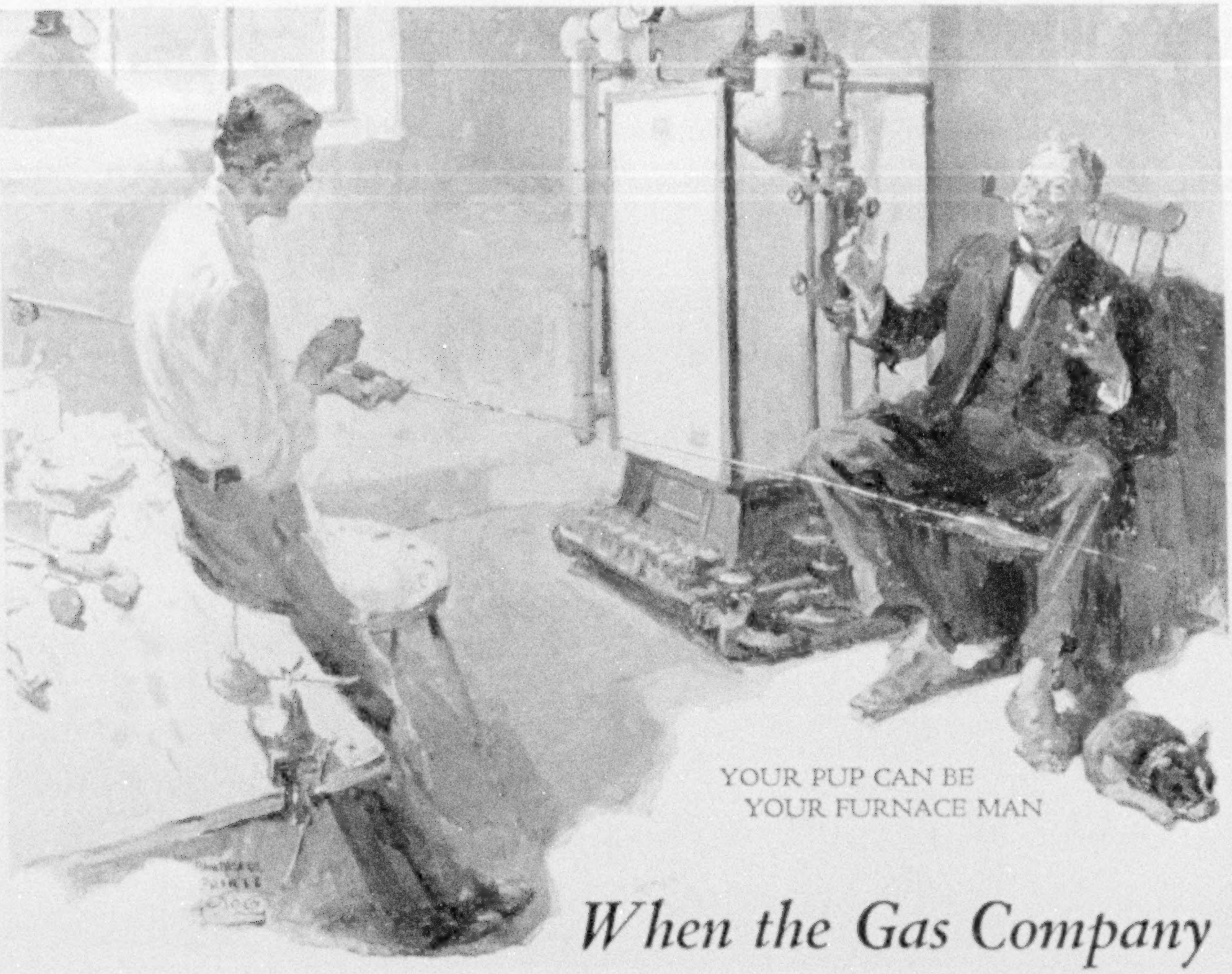

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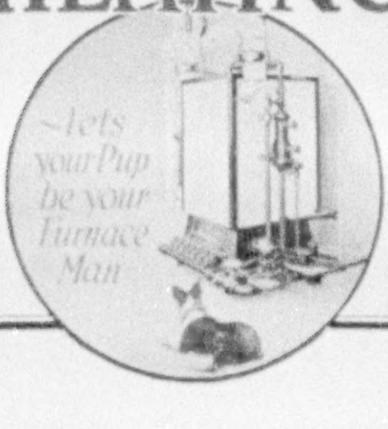
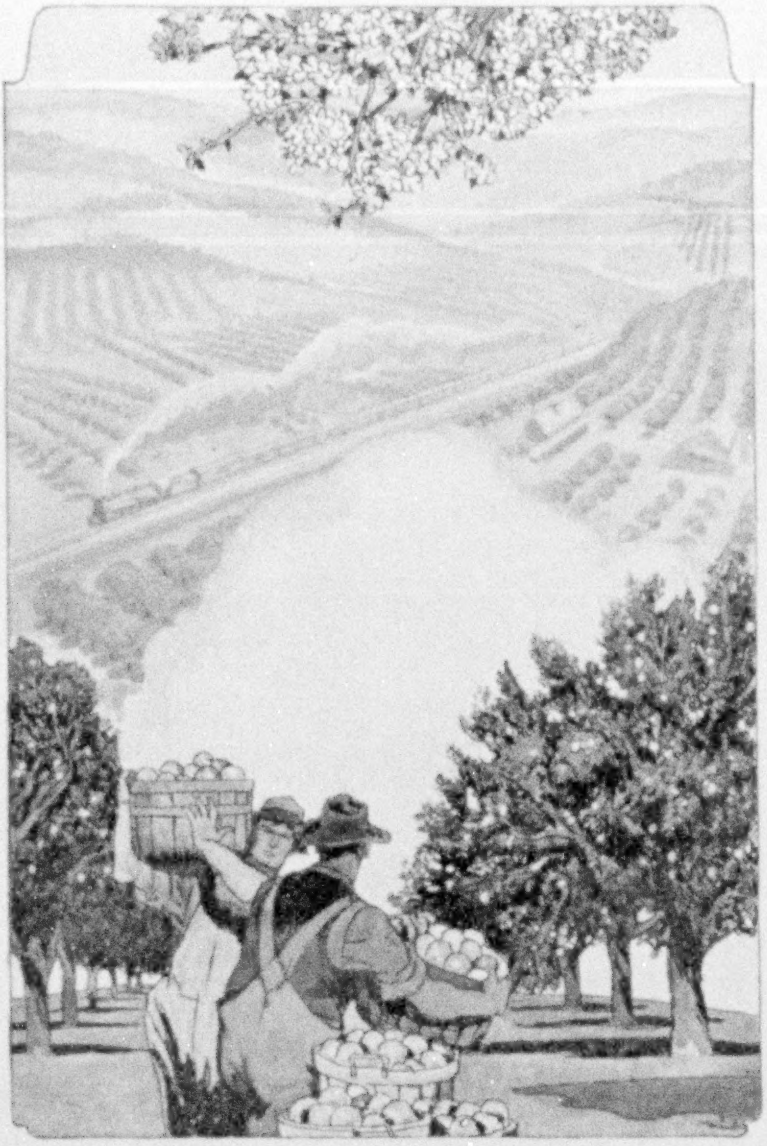

Lets your Pup be your Furnace Man



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"POSITIVE AGITATION"

"Positive Agitation"

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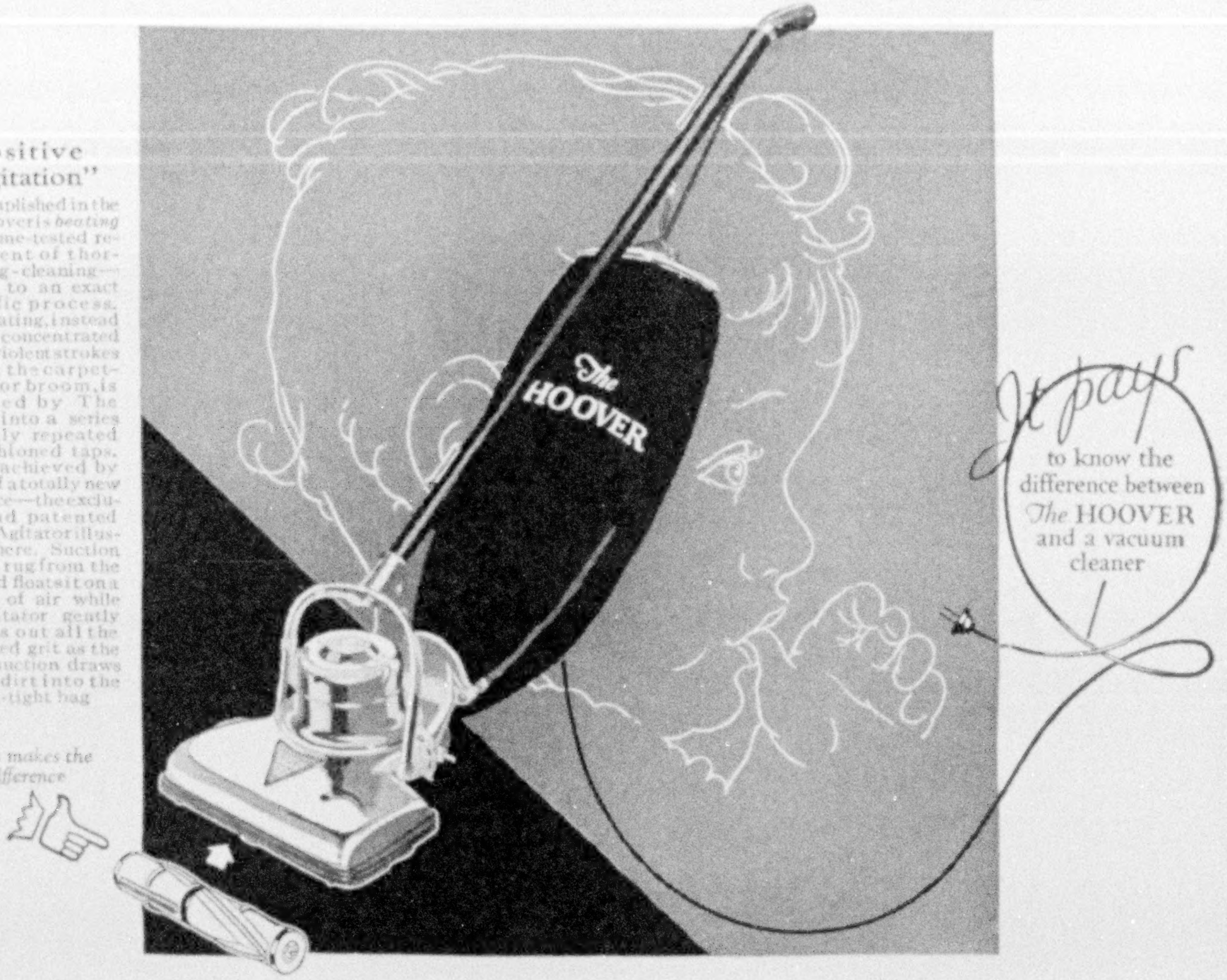
This makes the difference


The HOOVER
It pays to know the difference between The HOOVER and a vacuum cleaner

"Clean enough"—or C-L-E-A-N?

Can there be a question of *how* clean a rug ought to be—particularly when that rug is your baby's play-place? Think . . tiny fists clutch the soft nap . . rub sleepy eyes . . then, perhaps, furnish a solacing thumb to chew upon! Decidedly, here, "clean enough" *must* mean *clean!*

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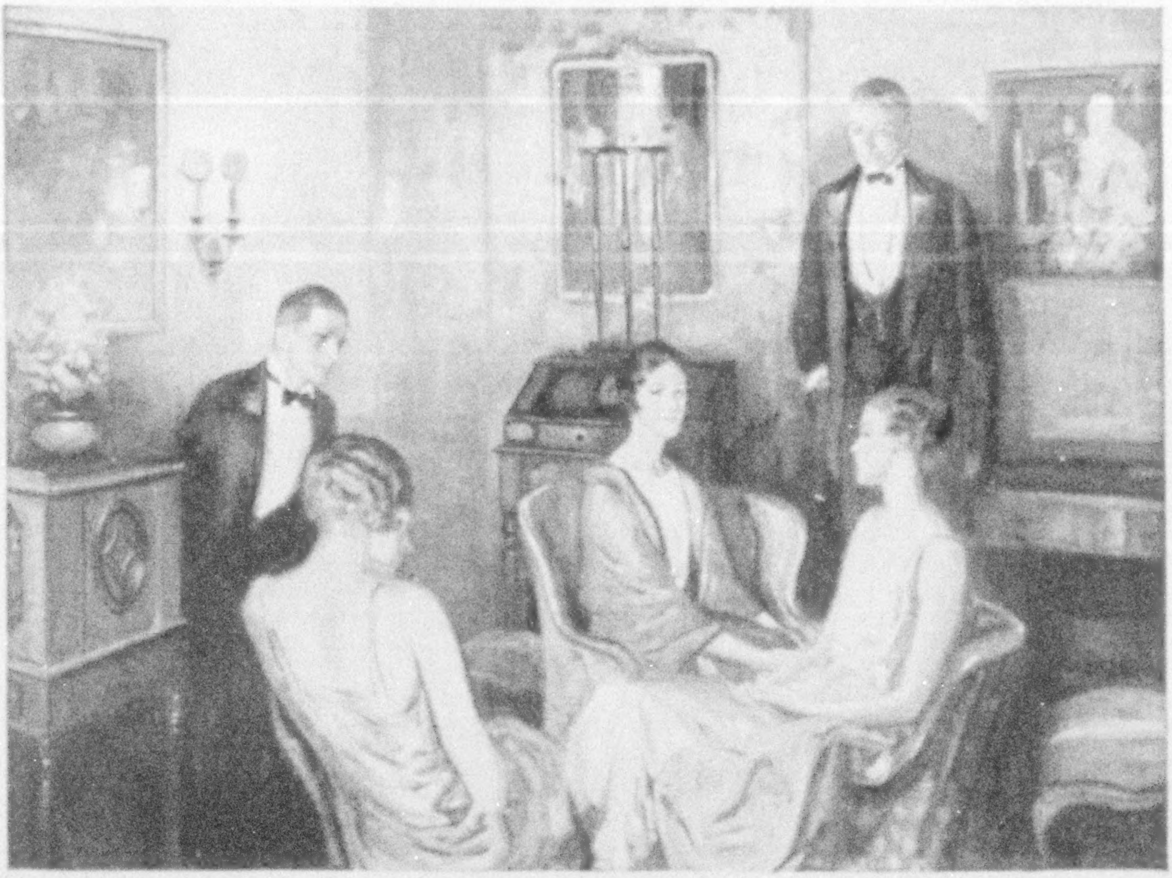

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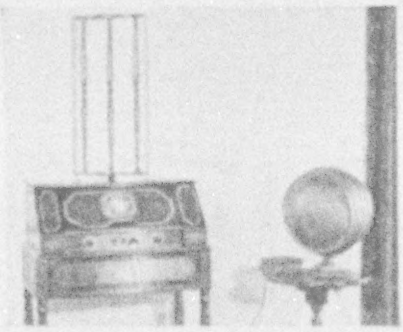

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